INDEX

No. of courses in all programme for AY 2018-2019

Number of courses in all programs for the AY 2018-2019

Sl No	Programme Name	Programme Code	First Year		Second Year		Third Year		Total
			SEM I	SEM II	SEM I	SEM II	SEM I	SEM II	
1	Civil Engineering	UG-CE	10	11	11	10	11	13	66
2	Computer Science and Engineering	UG-CSE	11	10	10	11	13	14	69
3	Electronics and Communications Engineering	UG-ECE	11	10	10	11	10	17	69
4	Electrical and Electronics Engineering	UG-EEE	10	11	11	10	11	14	67
5	Information Technology	UG-IT	11	10	10	11	10	16	68
6	Mechanical Engineering	UG-MECH	10	11	11	10	11	15	68
7	Structural Engineering	PG-STR	11	11	3	2	-	-	27
8	Computer Science and Technology	PG-CST	8	14	3	2	-	-	27
9	Communication Systems	PG-CS	11	11	3	2	-	-	27
10	Power Systems and Automation	PG-PSA	13	13	3	2	-	-	31
11	Information Technology	PG-IT	7	13	3	2	-	-	25
12	CAD/CAM	PG-CAD/CAM	11	11	3	2	-	-	27
Total			**124**	**136**	**81**	**75**	**66**	**89**	**571**

S.R.K.R. ENGINEERING COLLEGE CHINA AMIRAM 534 204. BHIMAVARAM

M. Jagapathi Raju

Principal

PRINCIPAL
S.R.K.R. Engg. College
BHIMAVARAM-534 204.

CIVIL ENGINEERING

Regulation: R17			I / IV - B.Tech. I - Semester						
CIVIL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Course Code	**Course Name**	**Category**	**Cr.**	**L**	**T**	**P**	**Int. Marks**	**Ext. Marks**	**Total Marks**
B17 BS 1101	English – I	BS	3	3	1	--	30	70	100
B17 BS 1102	Mathematics – I	BS	3	3	1	--	30	70	100
B17 BS 1105	Engineering Chemistry	BS	3	3	1	--	30	70	100
B17 ME 1101	Engineering Mechanics	ES	3	3	1	--	30	70	100
B17 ME 1102	Engineering Drawing	ES	3	1	--	3	30	70	100
B17 CE 1101	Environmental Studies	CE	2	2	1	--	30	70	100
B17 BS 1107	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100
B17 BS 1108	English Communication Skills Lab – I	BS	2	--	--	3	50	50	100
B17 BS 1109	Engineering Workshop & IT Workshop	BS	2	--	--	3	50	50	100
B17 BS 1111	Inner Engineering	BS	--	--	--	2	--	--	--
		TOTAL	**23**	**15**	**5**	**14**	**330**	**570**	**900**

CIVIL ENGINEERING

SYLLABUS: ENGLISH-I (B17 BS 1101)

(Common to all Branches)

Life through Language: An Effective Learning Experience Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I: People and Places:-Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types. Describing people, places and events-Writing sentences-Self-awareness- Self-motivation, Dialogue writing.

UNIT-II: Personality and Lifestyle: - Word quiz – Verbs-Adverbs-Negotiations-Proving yourself- Meeting Carl Jung- Describing yourself- Living in the 21st century- Using your dictionary- Communication-Adaptability.

UNIT-III: Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User‟s Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue- Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

UNIT-IV: Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewing employees- Your first interview- Reality TV- rating an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V: Work and Business: - A - Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS-I (B17 BS 1102)

(Common to all branches)

UNIT I: Differential equations of first order and first degree: Linear, Bernoulli, Exact, Reducible to exact types. Applications: Newton"s Law of cooling, Law of natural growth and decay, orthogonal trajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, xV(x), Method of Variation of parameters. Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms: Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplacetransforms.

UNIT IV: Partial differentiation: Introduction, Homogeneous functions, Euler"s theorem, Total derivative, Chain rule, which variable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign. Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange"s method (with constraints)

UNIT V: First order and higher order partial differential equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit"s method). Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type eax+by, sin (ax+by), cos (ax+by), xmyn.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also, will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also, will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

SYLLABUS: ENGINEERING CHEMISTRY (B17 BS 1105)
(Common to CIV, EEE & ME)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.

Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination of Calorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann"s by-product coke oven process; Refining of Petroleum, Knocking- octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG, CNG.

Lubricants: - Definition, Mechanism of Lubrication, Properties of Lubricants (Definition and significance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells-Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion- material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electrroless plating ; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials

Cement: - Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refactories. Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1105	
Course Title: ENGINEERING CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: ENGINEERING MECHANICS (B17 ME 1101)
(Common to CIV, EEE & ME)

UNIT-I:Basic Concepts: Scalar and vector quantities- Representation of vectors- Free vector force, Specification of force- Effect of force on rigid body- Free body diagram. Concurrent Forces in a plane: Principles of statics-Resolution and Composition of forces in a plane-Equilibrium of concurrent forces in a plane- Method of projections- Equilibrium of three forces in a plane Method of moments. Parallel Force system in a plane.

UNIT-II:Centroid & Moment of Inertia: Centroid & M.I – Arial & Mass M.I – Radius of Gyration, Parallel axis– Perpendicular axis theorem – Simple Problems.

UNIT-III:General Case of Forces in a Plane: Resultant and equilibrium of general case of forces in a plane, Statically determinate plane trusses-Method of joints and Method of sections.
Friction – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.

UNIT-IV:Dynamics of Particles : Rectilinear Motion – Kinematics, D‟Alembert‟s principle, Kinetics –Work & Energy – Impulse Moment, Direct Central Impact – coefficient of restitution.
Curvilinear Motion – Kinematics, Projectile Motion, Moment of momentum, Work & Energy in Curvilinear motion.

UNIT-V:Dynamics of Rigid Bodies : Rigid body rotation – Kinematics - Kinetics – Work & Energy in Rigid body rotation, Plane Motion – Kinematics – Instantaneous center of rotation, Kinetics - Work-Energy principle in plane motion.

Course Code: B17 ME 1101	
Course Title: ENGINEERING MECHANICS	
CO-1	Determine the resultant of the given force systems.
CO-2	Analyze force systems using equations of equilibrium.
CO-3	Determine centroid, centre of gravity and moment of inertia of areas and bodies.
CO-4	Analyze trusses and simple beams.
CO-5	Distinguish between kinematics and kinetics.
CO-6	Apply the work energy and impulse momentum methods of various engineering problems.

SYLLABUS: ENGINEERING DRAWING (B17 ME 1102)

(Common to CIV, EEE & ME)

UNIT I:Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.
Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II:Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP),Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

UNIT III:Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV:Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V: Conversion of isometric views to orthographic views- Conversion of orthographic views to isometric views**.**

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1102	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

SYLLABUS: ENVIRONMENTAL STUDIES (B17 CE 1101)

(Common to all Branches)

UNIT-I: Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. GlobalEnvironmental Crisis

Ecosystems: Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers and Decomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems Desert Ecosystems and Aquatic Ecosystems

UNIT-II: Biodiversity: Introduction to Biodiversity**,** Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

UNIT-III: Environmental and Natural Resources Management: Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture. **Forest Resources:** Use and over exploitation-Mining and Dams-their effects on forestand tribal people. **Water resources**: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. **Energy Resources:** Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

UNIT-IV: Environmental Pollution: Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India: Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

UNIT-V: Institutions and Governance:

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

SYLLABUS: ENGINEERING CHEMISTRY LAB (Code: B17 BS 1107)

(Common to CIV, EEE & ME)

LIST OF EXPERIMENTS

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by $KMnO_4$.
4. Estimation of oxalic acid by $KMnO_4$
5. Estimation of Mohr"s salt by $K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler"s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1107	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- I(Code: B17 BS 1108)

(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: ENGINEERING WORKSHOP & IT WORKSHOP(B17 BS 1109)

(Common to CIV, EEE & ME)

PART-A ENGINEERING WORKSHOP: SYLLABUS

Carpentry	Fitting
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

Note: At least two exercises to be done from each trade.

PART B: IT WORKSHOP: LIST OF EXCERCISES:

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.
3. MS-Office / Open Office

   a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
   b) Spread Sheet - organize data, usage of formula, graphs, charts.
   c) Power point - features of power point, guidelines for preparing an effective presentation.
   d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette,cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1109	
Course Title: ENGINEERING WORKSHOP & IT WORKSHOP	
	PART-A (ENGINEERING WORKSHOP)
CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.
	PART-B (IT WORKSHOP)
CO-1	Understand the basic components and peripherals of a computer.
CO-2	To become familiar in configuring a system.
CO-3	Learn the usage of productivity tools.
CO-4	Acquire knowledge about the netiquette and cyber hygiene.

INNER ENGINEERING (B17 BS 111)

(Common to CIV, EEE & ME)

UNIT-I:YES!+ Workshop: Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in thepresent Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya

UNIT-II:YES!+ Workshop: Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management –
Happiness point – Opposite Values – Pranayama – Sudarshan kriya

UNIT-III:YES!+ Workshop: Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling
mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life – Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

UNIT-IV: YES!+ Workshop:Creative Arts: Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

UNIT –V:Service: Leadership in action – Contributing to society – Take up Responsibility – Empowerment – Public Speaking – Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1111	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Regulation: R17	**I / IV - B.Tech. II - Semester**

CIVIL ENGINEERING
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION & EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

Course Code	Course Name	Category	Cr.	L	T	P	Int. Marks	Ext. Marks	Total Marks
B17 BS 1201	English – II	BS	3	3	1	--	30	70	100
B17 BS 1202	Mathematics – II	BS	3	3	1	--	30	70	100
B17 BS 1203	Mathematics – III	BS	3	3	1	--	30	70	100
B17 BS 1204	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS 1201	Computer Programming Using C	ES	3	3	1	--	30	70	100
# DS 1	Department Subject	ES	3	3	1	--	30	70	100
B17 BS 1206	Engineering PhysicsLab	BS	2	--	--	3	50	50	100
B17 BS 1208	English CommunicationSkills Lab – II	BS	2	--	--	3	50	50	100
B17 CS 1204	C Programming Lab	ES	2	--	--	3	50	50	100
B17 BS 1210	Engineering Physics Virtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS 1211	NCC	BS	--	--	--	2	--	--	--
TOTAL			**24**	**18**	**6**	**13**	**330**	**570**	**900**

#DS 1	CIVIL	B17 CE 1201	Building Materials and Construction
	EEE	B17 EE 1201	Circuit Theory
	MECHANICAL	B17 EE 1202	Basic Electrical and Electronics Engineering

CIVIL ENGINEERING

SYLLABUS : ENGLISH – II(B17 BS 1201)

(Common to all Branches)

UNIT I:

A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'
B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

UNIT II:

A. Detailed-Text: Unit 2: ' A Dilemma'
B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

UNIT III:

A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments
B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

UNIT IV:

A. Detailed-Text: Unit 4: 'The Lottery'
B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

UNIT V:

A. Detailed-Text: Unit 5: ' The Chief Software Architect'
B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS:MATHEMATICS – II (B17 BS 1202)

(Common to CIV, EEE & ME)

UNIT I: Solution of Algebraic and Transcendental Equations: Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation: Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backward differences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule, Simpson's 1/3 and 3/8th rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second order and fourth order).

UNIT IV: Fourier series: Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval"sformula.

UNIT V: Fourier Transforms: Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval's identities, Finite Fourier transforms.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1202	
Course Title: MATHEMATICS – II	
CO-1	Find a real root of algebraic and transcendental equations using different methods
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: MATHEMATICS – III (B17 BS 1203)

(Common to all Branches)

UNIT I: Linear systems of equations:
Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.
Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:
Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.
Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:
Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

UNIT IV: Vector Differentiation:
Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:
Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green's, Stokes' and Gauss divergence theorems.

SYLLABUS: ENGINEERING PHYSICS (B17 BS 1204)

(Common to CIV, EEE & ME)

UNIT I: Interference and Diffraction: Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton"s rings-Michelson"s interferometer. Fraunhoffer"s diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers: Introduction, Spontaneous emission and Stimulated emission – Einstein"s relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle- Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

UNIT- III: Electro Magnetic Fields and Ultrasonics: Concept of Electromagnetic induction , Faraday"s law, Lenz"s law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere"s law, Maxwell"s equations and their significance (without derivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids: Introduction, de Broglie matter waves- properties- Experimental confirmation, wave function- significance- Schrodinger"s time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands of crystalline solids- Distinction between Conductors, Semi conductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials: Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Co ordination number – Packing fraction for SC ,FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg"s law.

Introduction to Nanomaterials – Synthesis methods : Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1204	
Course Title: ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonics as a tool for technological applications.
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C(B17 CS 1201)

(Common to CIV, EEE & ME)

UNIT I:Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computationalprocedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts**.**

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling(gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II: Unit objective: Understanding branching, iteration and data representation using arrays
SELECTION MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if,examples, Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements , break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix**.**
STRINGS: concepts, c strings.

UNIT III: Objective: Modular programming and recursive solution formulation
FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV: Objective: Understanding pointers and dynamic memory allocation
POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:Objective: Understanding miscellaneous aspects of C
ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications
BIT-WISE OPERATORS: logical, shift, rotation, masks.
Objective: Comprehension of file operations
FILEHANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O,File I/O operations, example programs

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1201	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming.
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference.
CO-6	Understand the dynamics of memory by the use of pointers.
CO-7	Use different data structures and create/update basic data files.

SYLLABUS:BUILDING MATERIALS AND CONSTRUCTION(B17 CE 1201)

(For CIVIL)

UNIT I: STONES, BRICKS AND CLAY PRODUCTS

Stones: Classification of stones, Properties of building stones, Stone quarrying, precautions in blasting **Bricks:** Classification of Bricks, Manufacture of Bricks, general qualities of Bricks as per IS code, tests for good bricks as per IS code, including field tests.**Clay Products:**Tiles-types,manufacturing and their uses, Earth-wares, Terra-cotta, stone ware, Porcelain.

UNIT II: WOOD, WOOD BASED PRODUCTS

Wood: cross section details of trees, their general properties, characteristics of good timber defects in timber, mechanical properties of timber, seasoning and its importance, Decay of timber, **Wood based Products:** Veneers, Plywood and its types, Manufacturing of plywood, plywood grades as per IS code, Laminated wood, merits of plywood and laminated wood, LaminBoards, Block boards, Batten board, Particle boards

UNIT III: LIME, CEMENT & AGGREGATES

Lime: Various ingredients of lime, Constituents of lime stone, classification of lime , **Cement:**Natural and artificial cements, types of artificial cements and their uses, Wet and dry process of manufacturing ordinary Portland cement (OPC), composition of cement, Various fieldand Laboratory tests on OPC as per IS code, Storage of cement. **Aggregates:** Classification of aggregate – Coarse and fine aggregates, Particle shape and Texture, Specific gravity, Bulk density, porosity and Absorption, Moisture content of Aggregate – Bulking of sand, Sieve analysis.

UNIT IV: FINISHINGS, MASONRY AND FOUNDATIONS

Finishings: Paints and Varnishes: Constituents and characteristics of paints, types of paint and their uses, painting defects, causes and remedies. Constituents of varnishes, types of varnish and their uses, Pointing and Plastering. **Masonry:** Different types of Stone Masonry-Plan, Elevation,Sections of stone Masonry works- Brick Masonry- Different Types of Bonds-Plan, Elevation and section of Brick Bonds upto Two-Brick wall thickness- Partition walls-Different types of Block Masonry- Hollow concrete Blocks- FAL-G Blocks, Hollow Clay Blocks.**Foundations:**Types- strip, isolated, strap, combined footings, Raft-Mat- flat slab and Beam raft, box type raft.

UNIT V: ROOFING, FORM WORK & SCAFFOLDING

Roofing: Mangalore tiled roof, RCC roof, Madras terrace roof, Hollow tiled roof, Asbestos cement, Fibre glass, Aluminum G.I. Sheet roofing"s. **Form work, Scaffolding:** form work-types of formwork, centering- scaffolding-types of scaffolding. Trusses: Types- King post and queen post trusses and their uses. Stair cases: Various types of stair cases- dog legged, quarter landing, spiral stairs etc.

Course Outcomes for First Year Second Semester Course	
Course Code:B17 CE 1201	
Course Title: BUILDING MATERIALS AND CONSTRUCTION	
CO-1	Define and classify various stones, clay products used in construction sector.
CO-2	Find various types of wood their conversion and relevant BIS testing procedures to be carried out to ascertain the quality of building materials.
CO-3	Identify the major ingredients of construction materials like lime, cement, aggregate and their use in the construction industry.
CO-4	Select different materials for finishing’s and various constructions pertaining to masonry works and foundations.
CO-5	Develop the conceptual knowledge of various supports in building construction.

SYLLABUS:CIRCUIT THORY(B17EE1201)

(For EEE)

UNIT-I: Introduction to Electrical Circuits:
Passive components and their V-I relations. Sources (dependent and independent) -Kirchhoff"s laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta- to-star transformation). Source transformation technique, nodal analysis and mesh analysis.

UNIT-II: Network topology:
Definitions of Graph and Tree, Basic cutset and tieset matrices for planar networks, Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

UNIT-III: Magnetic Circuits:
Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits.Faraday"s laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling and composite magnetic circuit.Analysis of series and parallel magnetic circuits.

UNIT-IV: Single Phase A.C Systems:
Periodic waveforms (determination of rms, average value and form factor).Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance - Real, Reactive ,Apparent and Complex power. Node and mesh analysis of AC networks, Series and parallel resonance.Numerical problems.

UNIT-V: Three Phase Circuits:
Advantages of Three Phase Circuits, Balanced and Unbalanced systems, Relation between Line and Phase Quantities in Star and delta connected circuits, Analysis of Balanced & Unbalanced Three Phase Circuits.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1201	
Course Title: CIRCUIT THEORY	
CO-1	Various electrical networks in presence of active and passive elements.
CO-2	Electrical networks with network topology concepts.
CO-3	Magnetic circuit with various dot conventions.
CO-4	R, L, C network with sinusoidal excitation.
CO-5	Three phase AC circuits.

SYLLABUS: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING(B17 EE 1202)

(For ME)

UNIT I: Electrical and Magnetic Circuits:
Basic definitions, Types of network elements, Ohm‟s Law, Kirchhoff‟s Laws, Series and parallel Circuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday‟s laws, Lenz‟s law, statically induced EMF, dynamically induced EMF.

UNIT-II: DC Machines:
Principle of operation of DC generator- EMF equation-Types of DC Generators-DC motorTypes-Torque equation-Applications-Swinburne‟s Test, Speed control methods.

UNIT-III: Transformers:
Principle of operation of Single phase Transformers- EMF equation-losses-OC and SC Tests-Efficiency and Regulation.

UNIT-IV: AC Machines:
Principle of operation of Three phase Induction motor-Slip-Torque characteristics-Efficiency-applications- Principle of operation of Alternator-EMF equation, Regulation of alternator by synchronous Impedance method.

UNIT-V: Diodes-Rectifiers and Transistors:
PN junction diode-Forward bias and reverse bias operation, V-I characteristics-Diode applications (Half wave, Full wave and bridge rectifier), Zener diode.
PNP and NPN junction Transistors, Transistor as an amplifier, single stage CE amplifier, Frequency response of CE amplifier.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1202	
Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	
CO-1	Able to analyze the various Electrical networks and understand the basics of Magnetic Circuits.
CO-2	Able to understand the operation of DC generators, 3-Point starter and conduct the Swinburne's test.
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motors and alternator.
CO-5	Able to analyze the operation of Half-wave and Full-wave rectifiers and single stage CE amplifier.

SYLLABUS: ENGINEERING PHYSICS LAB (B17 BS 1206)

(Common to CIV, EEE & ME)

LIST OF EXPERIMENTS

(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton‟s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-CompoundPendulum.
6. Melde‟s experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee‟s apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young‟s modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck‟s constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1206	
Course Title: ENGINEERING PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the Instruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- II (B17 BS 1208)
(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: C PROGRAMMING LAB(B17 CS 1204)
(Common to CIV, EEE & ME)

List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is
   i) Prime Number
   ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Usingswitch…case
b) Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise – 8

Arrays

Demonstration

of arrays

a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure
b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.
    i) copy
    ii) concatenate
    iii) length
    iv) compare
b) Implementation of string manipulation operations **without** library function.
    i) copy
    ii) concatenate
    iii) length
    iv) compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.
b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)
b) The Lab record must be a print of the LATEX (.tex) Format.

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Course Code: B17 CS 1204	
Course Title: C PROGRAMMING LAB	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment**.**
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs**.**
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals**.**
CO-7	Identification of various computer components, Installation of software

SYLLABUS: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS(B17 BS 1204)
(Common to CIV, EEE & ME)

List of Experiments

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster‟s angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson‟s interferometer
13. Black body radiation

URL: www.vlab.co.in

(Note: Internal Marks of **Engineering Physics - Virtual Labs – Assignments** are to be considered as Assignment marks in the Internal Marks of **Engineering Physics- B17 BS 1204**)

Course Code: B17 BS 1210	
Course Title: ENGINEERING PHYSICS --VIRTUAL LABS – ASSIGNMENTS	
CO	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

NCC (B17 BS 1211)

(Common to CIV, EEE & ME)

The NCC- National Integration and Awareness- Drill- Personality Development Life Skills- Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

(**Note**: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17							II / IV - B.Tech. I - Semester		
CIVIL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Course Code	**Course Name**	**Category**	**Cr.**	**L**	**T**	**P**	**Int. Marks**	**Ext. Marks**	**Total Marks**
B17 BS 2101	Mathematics -IV	BS	3	3	1	--	30	70	100
B17 CE 2101	Mechanics of Solids	ES	3	3	1	--	30	70	100
B17 CE 2102	Environmental Engineering - I	ES	3	3	1	--	30	70	100
B17 CE 2103	Building Planning & Design	ES	3	3	1	--	30	70	100
B17 CE 2104	Surveying-I	ES	3	1	--	3	30	70	100
B17 CE 2105	Engineering Geology	ES	2	2	1	--	30	70	100
B17 CE 2106	Engineering Geology Lab	ES	2	--	--	3	50	50	100
B17 CE 2107	Strength of Materials Laboratory	ES	2	--	--	3	50	50	100
B17 CE 2108	AutoCAD for Civil Engineering	ES	2	--	--	3	50	50	100
B17 BS 2107	English Proficiency-I	BS	--	--	--	2	--	--	--
B17 BS 2108	Professional Ethics & Human Values	BS	--	2	--	--	--	--	--
		TOTAL	**23**	**20**	**6**	**11**	**330**	**520**	**850**

CIVIL ENGINEERING

SYLLABUS: MATHEMATICS IV (B17BS2101)

(Common to CE,ECE,EEE& ME)

UNIT-I Functions of a Complex Variable
Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n , e^z,sin z, sinh z and log z **(no questions may be set).**
Limit and continuity of a function of the complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, finding an analytic function, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: the transformations defined by w = z+c, w = cz, w = 1/z, the Bilinear transformation, $w = z^2$ and $w = e^z$.

UNIT-II Applications of Partial Differential Equations
Method of separation of variables, One –dimensional wave equation, the D"Alembert"s solution, one-dimensional heat equation, two-dimensional heat flow in steady state (solution of two-dimensional Laplace equation in Cartesian coordinates only)

UNIT-III Difference Equations And Z-Transforms
Formation of a difference equation, Rules for finding complimentary function and particular integral for linear difference equations.
Definition of Z- transform, some standard Z- transforms, properties, transform of a function multiplied by n, initial value theorem and final value theorem(without proof), evaluation of inverseZ- transforms, convolution theorem (without proof), solution of linear difference equations by the use of Z- transforms.

UNIT-IV Probability Distributions
Binomial distribution, Poisson distribution, Normal distribution: Definition (pmf/pdf), notation, mean, variance, moment generating function, probability generating function and fitting of a distribution.

UNIT-V Sampling Theory
Sampling theory: Sampling distribution, standard error, testing of Hypothesis, level of significance, confidence limits, simple sampling of attributes, sampling of variables, estimation of mean and variance.
Large samples: testing of hypothesis for sample proportion, two proportions, single mean and two means.
Small samples: Degrees of freedom, Students" t- distribution, t-test for single mean, two means; Chi- squared distribution-testing the goodness of a fit.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2101	
Course Title: MATHEMATICS – IV	
CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.

SYLLABUS: MECHANICS OF SOLIDS (B17 CE 2101)

UNIT-I Simple stresses & Strains:
Definitions of stress and strain – types of stresses and strains – Elasticity – Hooke"s law – Stress – Strain diagram for Mild steel – working stress- factor of safety- Lateral strain – Poisson"s ratio and volumetric strain – Elastic Moduli and the relationship between them – Bars of varying section – composite bars – temperature stresses.

Strain Energy
Definition – Resilience – SE due to gradually applied; suddenly applied and impact loads – simple applications.

UNIT-II Shear Force & Bending Moment Diagrams:
Definition of beam – Types of beams – concept of SF and BM – SF &BM diagrams for cantilever,SS and overhanging beams subjected point loads, UDL, Uniformly varying loads and combination of these loads – point of contraflexure – Relationship b/w S.F, BM and rate of loading.

UNIT-III Flexural Stresses:
Theory of simple Bending – Assumptions–Derivation of Bending equation - ($\frac{M}{I} = \frac{F}{Y} = \frac{E}{R}$)
Neutral axis – Determination of bending stresses – section modulus of rectangular, & Circularsections (Solid and Hollow), I,T, channel sections – Design of simple beam sections.

Shear Stresses
Derivation of shear stress formula – shear stress distribution across various beam sections likerectangular, circular, Triangular, I, T, angle sections, built up beams, Definition of shear centre.
Deflections of Beams: (i) Cantilever (ii) Simply supported and (iii) Over hanging beams using (a)Double integration and (b) Macaulay"s method.

UNIT-IV Principal Stresses and strains:
Introduction-stresses on an inclined section of a bar under axial loading- compound stresses-Normal and tangential stresses on an inclined plane for biaxial stresses-Two perpendicular normal stresses accompanied by a state of simple shear-Mohr"s circle of stress-Principal planes and principal stresses- Construction of Mohr"s Circle (graphical Method)

Torsion of Circular Shafts
Theory of pure Torsion – Derivation of Torsion equation ($\frac{T}{J} = \frac{r_{max}}{R} = \frac{G\theta}{l}$) – Torsional moment of Resistance – polar section Modulus – power transmitted by a shaft – combined bending and torsion.

Springs
Types of springs – springs in series and parallel – close coiled helical springs

UNIT-V Columns & Struts:
Introduction – short, medium and long columns – axially loaded compression members – crushing load – Buckling load (or) critical load (or) crippling load – Euler"s theory for long columns – Assumptions – Derivations of Euler"s critical load formula for various end conditions – Effective length of column – slenderness ratio – limitations of Euler"s Theory – Rankine formula – for both long and short columns – column subjected to Eccentric loading – Euler"s Method and prof. Perry"s formula.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE 2101	
Course Title: MECHANICS OF SOLIDS	
CO-1	Summarize the behavior of basic materials under the influence of different external loading conditions and support conditions. (K2)
CO-2	Determine shear Force and Bending moments in statically determinate Beams and draw the Diagrams. (K5)
CO-3	Examine the different methods to find slope and deflection of beams subjected to loads(K4)
CO-4	Estimate the principal stresses & strains and torsional stresses in structural members(K3)
CO-5	Evaluate the crippling load for columns with different end conditions. (K5)

ENVIRONMENTAL ENGINEERING – I(B17 CE 2102)

UNIT – I: Necessity and objectives of protected water supply system - Flow chart of public water supply system
– Role of environmental agencies
Water Demand and Quantity studies: Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand, Variations in the Demand, Design Period, Factors affecting the Design period, Population Studies, Population Forecasting Studies.

UNIT – II: Hydrological Concepts: Hydrological Cycle - Types of Precipitation - Measurement of Rainfall. Surface sources of water: Lakes, Rivers, Impounding Reservoirs - Capacity of storage reservoirs - Mass curve analysis. Groundwater sources of water: Types of water bearing formations – Springs - Wells and Infiltration galleries, Yields from wells and infiltration galleries.

UNIT – III: Collection of Water: Factors governing the selection of the intake structure - Types of Intakes - Conveyance of Water: Gravity and Pressure conduits - Types of Pipes - Pipe Materials, Pipe joints - Design aspects of pipe lines - Laying of pipe lines.
Quality and Analysis of Water: Characteristics of water – Physical, Chemical and Biological. Analysis of Water – Physical, Chemical and Biological - Impurities in water - Water borne diseases - Drinking water quality standards.

UNIT – IV: Treatment of Water: Flowchart of water treatment plant, Treatment methods (Theory and Design) - Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration, Chlorination and other Disinfection methods.

UNIT – V: Softening of Water, Defluoridation, Removal of odours.
Distribution of Water: Methods of Distribution system - Components of Distribution system .

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE2102	
Course Title:ENVIRONMENTAL ENGINEERING	
CO-1	Explain the quality of water.[K2]
CO-2	Analyze the water quality parameters and compare with the permissible limits. [K4]
CO-3	Summarize the working principles of conventional unit operations of a water treatment plant. [K2]
CO-4	Determine the sizes of different unit operations in a water treatment plant. [K5]
CO-5	Assess the suitability of conventional methods and latest membrane processes for different water bodies.[K5]
CO-6	Design a conventional water treatment plant with given specifications for given capacity. [K6]

BUILDING PLANNING & DESIGN(B17 CE 2103)

UNIT – I Climatology:
Elements of climate: Sun, Wind, Relative Humidity, and Temperature. Comfort conditions for house. Various types of Macroclimatic zones, Design of Houses and layouts with reference to climatic zones, Ventilation, Principles of Planning, Orientation of Buildings.

UNIT – II Residential Buildings:
Different types of Residential Buildings, Selection of site for residential buildings. Guidelines for planning and drawing of residential building. General building regulations and byelaws for residential buildings.

UNIT-III Preliminary Drawings :
(a) Conventional signs of materials various equipment used in a Residential Building (copying exercise) (b) Plan section and Elevation of a small House (one room and verandah) (copying exercise) (c) Plan section and Elevation of Two Bed Room House (copying exercise) (d) Plan section and Elevation of three bed room house in Hot and Humid zone, Hot and Arid zone, cold zone (copying exercises) (e) Design of Individual rooms with particular attention to functional and furniture requirements. Building regulations and Byelaws of Residential Buildings . Drawing the Plan Section and Elevation of Houses with given Functional requirements and climatic data. (Emphasis may be given to Hot and Humid zones.)

Note:
The question paper consists of Part-A and Part-B. Part-A consists of 4 questions, 2 questions for each of Unit – I & II and Part-B consists of a compulsory question for 38 marks

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE 2103	
Course Title: BUILDING PLANNING & DESIGN	
CO-1	Understand various types of buildings and housing concept.
CO-2	Apply the concepts of climatology and orientation of both residential and commercial buildings.
CO-3	Apply the principles of planning and byelaws used for building planning.
CO-4	Recommend appropriate planning for 2 Bed room and 3 Bed room houses.
CO-5	Draw plan, elevation and section for various structures.
CO-6	Design individual rooms with attention to functional and furniture requirements.

SYLLABUS:SURVEYING-I(B17 CE 2104)

UNIT-I Introduction :

Classification and principles of surveying. Triangulation and Trilateration Earth as spheroid, datum, geoid, Azimuth,latitude, longitude, Map projections, scales, plans, & Maps. Chain surveying: Instrumentation for chaining – Errors due to incorrect chain-Chaining on uneven and sloping ground- Errors in chaining-Tape corrections – Problems: Base line measurement- chain Triangulation-Check lines, Tie lines, Offsets. Basic problems in chaining, obstacles in chaining-Problems-Conventional signs.

UNIT -II Compass Survey :

Introduction to compass survey Definitions of Bearing. True bearing, True meridian, Magnetic Meridian, Magnetic bearing – Arbitrary Meridian, R.B. & B.B of lines – Designation of bearings –

W.C.B. & R.B. – Conversion of bearings from one system to the other Related problems – Calculation of angles for bearings, Calculation of bearing for angles, Related problems – Theory of Magnetic compass (i.e. Prismatic compass) – Magnetic dip-Description of Prismatic compass. Temporary adjustments of compass-Magnetic Declination – Local attraction-Related Problems-Errors in compass survey.

UNIT- III Traverse Surveying :

Chain and compass traversing-Free or loose needle method – Fastneedle method-Checks in closedand open traverse-Plotting methods of traverse Survey - Closing error-Balancing the traverse-Bowditch"s method-Transist method, Gale"s Travers tablePlane table surveying:

Introduction-Advantages, Accessories-Working operations such as fixing the table to tripod, levelling-centering-orientation by back-sighting.

UNIT -IV Levelling :

Definitions of terms-Methods of levelling-Uses and adjustments of dumpy level-Temporary and permanent adjustments of dumpy level levelling staves-Differential leveling, Profile levelling-Cross sections-Reciprocal levelling. Precise levelling-Definition of BS, IS, FS, HI, TP-Booking and reduction of levels, H.I. methods-Rise and fall method-Checks-Related problems-Curvature and Refraction Related Problems-Correction-Reciprocal levelling- Related problems-L.S & C.S Levelling-Problems in levelling-Errors in levelling.

Contouring:

Definitions-Interval, Characteristics of contours-methods of locating contours. Direct and indirect methods-interpolation of contours-Contour gradient-Uses of contour maps. Contours mapping usingcomputer techniques (surfer, CAD)

UNIT -V: Minor instruments :

Uses and adjustments of the following minor instruments:

Line Ranger, Optical Square, Abney level, Clinometer, Ceylon Ghattracer, Pantagraph, Sextant and Planimeter.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE 2104	
Course Title: SURVEYING-I	
CO-1	Appreciate the importance of preparation of Map and Plan for required site with suitable scale.
CO-2	Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
CO-3	Judge on which type of instrument to be used for carrying out survey for a specific work
CO-4	Describe different modern instruments used in surveying.

SYLLABUS:ENGINEERING GEOLOGY(B17 CE 2105)

UNIT-I Introduction to General Geology:
Importance of geology from civil engineering point of view. Branches of Geology. Weathering – types and its engineering importance; Erosion, Soils: Soil profile, soil formation, types of Indian soils. Land forms produced by: running water and glaciers, Land Wind, Sea Waves and Currents and Ground Water.

UNIT-II Mineralogy &Petrology:
Mineralogy: Mineral definition, physical properties of minerals. Study of important rock forming minerals: Silicate structures, Quartz, Feldspars, Pyroxenes, Amphiboles, Micas and Clays.
Petrology: Definition of rock. Types of rocks - Ingenious rocks: Granite, Synite, Dolerite, Gabro, Diorite, Basalt. Sedimentary rocks: Breccia, Conglomerate, Sandstone, Shale, Limestone. Metamorphic rocks: Gneiss, Khondalite, Schist, Slate, Marble, Quartzite, Charnokite. Engineering properties of rocks.

UNIT-III Statigraphy& Structural Geology:
Statigraphy: GeologicalTime scale, Major geological formations of India and their geological importance - Achaeans, Cuddapahs, Vindyans, Gondwanas and Deccan Traps. Mineral resources of Andhra Pradesh.
Structural Geology: Elements of Structural Geology - Strike, Dip, Plunge. Working principles of Clinometer compass and Brunton Compass and their use in Civil Engineering. Study of Geological Structures - Folds, Faults and Joints.

UNIT-IV Remote Sensing and Geophysical Methods:
Remote Sensing: Introduction, Electromagnetic Spectrum, Aerial Photographs: types of aerial photos. Elements of photo interpretation. Satellite Remote Sensing: Satellites, Sensors and Data Products. Principles of Geographical Information Systems. RS and GIS applications to Civil Engineering.
Geophysical Methods: Principles of Geophysical Methods, Electrical, Seismic, Gravity and Magnetic. Principle of Resistivity method and configurations. Applications of Resistivity Method: Soil Profile, Hard rock and Ground Water Table. Principles of Seismic refraction and reflections methods and their applications to Civil Engineering problems.

UNIT-V Geological Investigations:
Role of Engineering Geologist in planning, design and construction and post construction stages in Civil Engineering works. Geological investigations for Dams and Reservoirs and Tunnels, Geological investigations for bridges and multistoried structures. Geological investigations for highways, air fields and railway lines. Geological investigations for Coastal structures and Environmental Geology.

Course Outcomes for Second Year First Semester Course	
Course Code:B17 CE 2105	
Course Title:ENGINEERING GEOLOGY	
CO-1	The course will provide the students with basic knowledge and understanding in the most central part of engineering geology, rock and soil.
CO-2	Students should develop an appreciation of geologic processes and their influence civil engineering works.
CO-3	The course will give students an overview and an understanding of the engineering properties of rock and soil materials.
CO-4	Based on lectures and exercises, students will gain basic understanding of the importance of engineering geology related to technical issues during construction.
CO-5	Students will develop the ability to perform basic engineering geological assessments and analysis, and to understand the relevance of engineering geology in complex projects in and on solid rock.

SYLLABUS: ENGINEEIRNG GEOLOGY LAB(B17 CE 2106)

List of Experiments:

1. Study of physical properties and identification of minerals.
2. Megascopic identification of rocks and their Engineering properties.
3. Description and Identification of Geomorphological models.
4. Description and Identification of Structural models.
5. Simple Structural Geology problems.

Lab Examination Pattern:

1. Description and identification of SIX minerals.
2. Description and identification of SIX rocks (Igneous, Sedimentary and Metamorphic rocks).
3. Identification of Geomorphology model.
4. Identification of Structural geology model.
5. Problem on Strike and Dip.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE2106	
Course Title: ENGINEEIRNG GEOLOGY LAB	
CO-1	Elucidate the mega-scopic identification of minerals.
CO-2	Categorize the rocks according to mega-scopic description
CO-3	Interpret geological maps
CO-4	Estimate the types of subsurface formation by using geophysical methods

SYLLABUS: STRENGTH OF MATERIALS LABORATORY(B17 CE 2107)

List of Experiments:

1. Tension test on Mild/HYSD Steel bar
2. Compression test on wood (Parallel and Perpendicular to grains)
3. Test on spring
4. Brinell"s Hardness test
5. Charpy and Izod impact tests
6. Double Shear test
7. Bending test on Steel and Wood as Simply supported beamsand Cantilever beams.
8. Verification of Maxwell"s Reciprocal theorem on simply supported beam.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE2107	
Course Title: STRENGTH OF MATERIALS LABORATORY	
CO-1	The student clearly understands the concepts of deciding the shape or type of specimen for assessing the respective strengths against various straining actions.
CO-2	The student can design the specimens for assessing a particular property of the material with the available machines.
CO-3	The student can design the experiments making use of various techniques of load measuring or deformation measuring instruments.
CO-4	The student will be confident to decide the range of the machine and set the machine accordingly by suitable modifications, for results with a finer degree of accuracy.

SYLLABUS: AUTOCAD FOR CIVIL ENGINEERING(B17 CE 2108)

Fundamentals of Computers

1. Introduction
2. Computer Hardware and Software Concepts
3. Introduction of Personal Computer and Operating SystemsWINDOWS-XP,Windows- 7,File Management
4. Drawing using AutoCAD
5. Starting a New Drawing/Opening an existing drawing
6. Drawing Commands
7. Hatching Command Text (multi-line & single line) and Formatting Text Styles
8. View Commands & Drawing Settings and Aids
9. Modify Commands
10. Dimension Command Formatting Dimension Style and Multi-leader Style
11. Drawing Settings and Aids
12. Saving and Plot
13. Simple Building Drawing

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE2108	
Course Title: AUTOCAD FOR CIVIL ENGINEERING	
CO-1	Student's ability to perform basic sketching techniques will improve.
CO-2	Student's ability to use architectural and engineering scales will increase.
CO-3	Student's ability to produce engineered drawings will improve.
CO-4	Student's ability to convert sketches to engineered drawings will increase.
CO-5	Student's will become familiar with office practice and standards.
CO-6	Student's will become familiar with AutoCAD two dimensional drawings.
CO-7	Student's will develop good communication skills and teamwork.

SYLLABUS:ENGLISH PROFICIENCY-I(B17 BS 2107)

(Common to All Branches)

UNIT-I :LISTENING

Selected Motivational
SpeechesSelected Moral
Stories

UNIT-II :SPEAKING

Book
Review
Skit
Presenta
tion
PowerPoint
Presentations
Describing
event/place/thing
Extempore
Group Discussion
Picture Perception and Describing Test

UNIT-III : READING

Speeded Reading
Reading
Comprehension

UNIT-IV :WRITING

Paragraph Writing
Literary Appreciation – Understanding the Language of Literature

UNIT-V :PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2107	
Course Title: ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

SYLLABUS:PROFESSIONAL ETHICS & HUMAN VALUES(B17 BS 2108)

(Common to CIVIL,EEE & MECH)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, **Human Values** –Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, ProfessionalEthics
Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:
Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:
Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexualharassment at work place.

UNIT – V

Global Issues:
Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living,concept of Harmony in life.

Course Code: B17 BS 2108	
Course Title: PROFESSIONAL ETHICS & HUMAN VALUES	
CO	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Regulation: R17									II / IV - B.Tech. II- Semester
CIVIL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Course Code	**Course Name**	**Category**	**Cr.**	**L**	**T**	**P**	**Int. Marks**	**Ext. Marks**	**Total Marks**
B17 CE 2201	Structural Analysis -I	BS	3	3	1	--	30	70	100
B17 CE 2202	Fluid Mechanics- I	ES	3	3	1	--	30	70	100
B17 CE 2203	Environmental Engineering - II	ES	3	3	1	--	30	70	100
B17 CE 2204	Concrete Technology	ES	3	3	1	--	30	70	100
B17 CE 2205	Surveying - II	ES	3	3	1	--	30	70	100
B17 CE 2206	Remote Sensing & GIS	ES	3	3	1	--	30	70	100
B17 CE 2207	Surveying Field Work	ES	2	--	--	3	50	50	100
B17 CE 2208	Fluid Mechanics Lab- I	ES	2	--	--	3	50	50	100
B17 CE 2209	Industry Oriented Technology Lab	ES	1	--	--	2	50	--	50
B17BS 2206	English Proficiency-II	BS	--	1	1	--	--	--	--
		TOTAL	**23**	**19**	**7**	**8**	**330**	**520**	**850**

CIVIL ENGINEERING

SYLLABUS:STRUCTURAL ANALYSIS(B17CE 2201)

UNIT – I: Deflections of Beams

By using (i) Moment area method (ii) Conjugate beam method (iii) Unit load method (iv) Castigliano"s theorem-1.

Strain- energy due to (i) Axial load (ii) Bending Moment (iii) Shear force and (iv) Torque

Deflections of Statically Determinate Structures: (a) Single storey, single bay rectangular portal frames using (i) Unit load method, (ii) Castigliano"s theorem-1. (b) Trusses (having 9 members or less) using (i) Unit load method, (ii) Castigliano"s theorem-1.

UNIT – II: Propped Cantilevers, Fixed Beams

Analysis of propped cantilever by method of consistent deformation.

Fixed Beams: Fixed end moments for beams of uniform section for different types of loading; Effect of sinking of support; effect of Rotation of a support; BMD for fixed beam.

UNIT – III: Continuous Beams

1. Analysis of continuous beams by
2. Theorem of three moments
3. Slope deflection method
4. Moment distribution method
5. Kani"s method.

UNIT – IV: Influence Lines and Moving Loads

Definition – Influence line for Reaction, SF and BM-Load position for Max SF at a section –Load position for max BM at a section- Single point load, U.D.L longer than the span, U.D.L.shorter than the span- Focal length.

Introduction of moving loads – Max SF and BM at a given section and absolute Max SF and BM due to single concentrated load, U.D.L. longer than the span, U.D.L. shorter than the span, two point loads with fixed distance between them and several point loads, Maximum Bending moment at a section under a wheel load and absolute maximum Bending moment in the case of several wheel loads- Equivalent uniformly Distributed load.

UNIT -V: Thin cylinders:

Calculation of longitudinal and hoop stresses in thin cylinders subjected to internal pressure, Wire wound thin cylinders.

Thick cylinders- Lame"s theory, Compound tubes.

Theories of failures (i) Maximum Principal stress theory, (ii) Maximum Principal strain theory, (iii) Maximum shear theory (iv) Maximum strain energy theory and (v) Maximum distortion theory.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE2201	
Course Title: STRUCTURAL ANALYSIS – I	
CO-1	Determine deflections in determinate beams by different methods.
CO-2	Evaluate the strain energy for structural members subjected to different loads.
CO-3	Analyze different indeterminate beams for BM and SF by different methods of analysis.
CO-4	Determine reactions, BM & SF in beams subjected to moving loads.
CO-5	Distinguish between thin and thick cylinders and understand different failure theories.

SYLLABUS:FLUID MECHANICS- I (B17 CE 2202)

UNIT – I:

Basic Fluid Properties: Definition of Fluid, basic properties of fluid, Viscosity - Newton‟s Law of Viscosity, Capillarity and Surface Tension.

Fluid Pressure: Fluid Pressure at a point, Pascal‟s law, Variation of pressure with elevation, Hydrostatic law, Absolute, Gauge and Vaccum Pressures. Pressure measurement – Piezometers, Manometers and Pressure Gauges. Centre of Pressure, Forces on submerged surfaces, crest gates and lock gates.

UNIT – II:

Buyoancy and Floatation: Archimedes Principle- Buoyancy & Floatation - Stability of Floating Bodies- Centre of Buoyancy - Metacentric Height and its Determination.

Fluid Kinematics: Types of fluid flow, Velocity, Rate of flow, Continuity Equation, Streamline, Path line, Streak line, Local, Convective and Total Acceleration; One & Two Dimensional Flows. Stream Function, Velocity Potential- Rotational &Irrotational Flows, Laplace Equation, Flow net.

UNIT – III:

Fluid Dynamics: Energy possessed by fluid in motion, Euler‟s equation of motion - Bernoulli‟s equation. Energy correction factor.

Flow through orifices and mouth pieces: Types of orifices and mouth pieces, coefficient of contraction, velocity and discharge.

Flow through notches and weirs: Types of notches and weirs, Measurement of discharge.

UNIT – IV:

Impulse momentum equation – Momentum correction factor, Forces on pipe bends and reducers. Angular Momentum – Torque and work done; Sprinkler Problems.

Laminar Flow: Relation between shear and Pressure Gradients in Laminar Flow; Reynold‟s experiment; Critical velocity; Steady laminar flow through a circular pipe – Hagen Poiseuille‟s Law.

UNIT – V:

Flow through pipes: Flow measurement through pipes – Venturimeter, orificemeter, nozzlemeter. Loss of head, head loss due to friction – Darcy –Weisbach equation, minor losses, Total Energy Line, Hydraulic Gradient Line.Pipes in Series, pipes in parallel.Problems on Two reservoir and three reservoir flows.Water hammer, surge tanks.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE2202	
Course Title: FLUID MECHANICS- I	
CO-1	Determine the physical properties of fluids and different types of forces acting on a fluid element extended to forces on various gates.
CO-2	Determine the forces that are acting on immersed bodies in static fluids through application of buoyancy and floatation.
CO-3	Determine different types of fluid flows to find out the local and convective accelerations in 1D, 2D flows fields and derive the Laplace equation.
CO-4	Apply conservation principles of mass momentum and energy on fluids through system and control volume approaches.
CO-5	Calculate the force exerted by the fluid on bends, nozzles, plates and vanes by impulse momentum principle.
CO-6	Analyze the steady laminar and turbulent flows through pipes and solve pipe networks for series and parallel pipes to solve two reservoir and three reservoir problems.

SYLLABUS:ENVIRONEMNTAL ENGINEERING – II(B17 CE 2203)

UNIT – I

Sanitation – systems of sanitation– sewerage systems – Estimation of sewage flow and storm water – design of sewers –sewer types – Layout of sewer network – materials for sewers – cleaning and ventilation methods – sewer appurtenances

UNIT – II

Pumping – necessity – pumping station – its location – functions – types of pumps- sewage and water pumping requirements- House drainage systems – traps – classification – drain pipes – plumbing systems – Layout of building drainage – Storm water drainage

UNIT – III

Quality of sewage –Sampling and analysis - decomposition- cycles of decomposition – BOD – COD – Layout of sewage treatment plant – F/M importance – preliminary treatment – screens – grit chamber – skimming tanks – Primary treatment – Sedimentation tanks

UNIT – IV

Secondary treatment – Attached growth process – contact beds – intermittent sand filters – trickling filters – Suspended growth process – activated sludge process- Miscellaneous methods for sewage treatment – oxidation ponds - oxidation ditches - RBC"s - sewage lagoons- extended aeration process – septic tanks – imhoff tanks

UNIT - V

Sewage disposal methods – natural and artificial methods –Sludge generation- characteristics -treatment- sludge disposal methods.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE 2203	
Course Title: ENVIRONEMNTAL ENGINEERING – II	
CO-1	Compare water and waste water.
CO-2	Explain principles of conventional treatment process and miscellaneous treatment techniques.
CO-3	Examine the operational differences of each unit process.
CO-4	Interpret the feasible technique required for particular waste water.
CO-5	Determine the size of unit operations using working principles of each.

SYLLABUS: CONCRETE TECHNOLOGY (B17 CE 2204)

UNIT-I :Ingredients Of Concrete Cements &Admixtures: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size.

UNIT – II:Fresh Concrete: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete- Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete.

UNIT – III:Hardened Concrete: Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression tests – Tension tests– Factors affecting strength – Flexure tests –Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – IV:Elasticity, Creep & Shrinkage– Modulus of elasticity – Dynamic modulus of elasticity – Poisson"s ratio – Creep of concrete – Factors influencing creep – Relation between creep & time– Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT – V

Mix Design: Factors in the choice of mix proportions– Quality Control of concrete – Statistical methods – Acceptance criteria – Concepts Proportioning of concrete mixes by various methods –ACI method of mix design, British DoE method of mix design and mix design as per IS 10262:2009.

Special Concretes: Ready mixed concrete, Shotcrete -Light weight aggregate concrete – Cellular concrete – No-fines concrete, High density concrete, Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C, Polymer concrete – Types of Polymer concrete – Properties of polymer concrete, High performance concrete – Self consolidating concrete, SIFCON, self healing concrete.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE 2204	
Course Title: CONCRETE TECHNOLOGY	
CO-1	Understand the basic concepts of concrete.
CO-2	Realize the importance of quality of concrete.
CO-3	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.
CO-4	Test the fresh concrete properties and the hardened concrete properties.
CO-5	Evaluate the ingredients of concrete through lab test results.
CO-6	Design the concrete mix by BIS method.
CO-7	Familiarize the basic concepts of special concrete and their production and applications.
CO-8	Understand the behavior of concrete in various environments.

SYLLABUS:SURVEYING – II(B17 CE 2205)

UNIT – I

Theodolite- Types of Theodolite – Temporary Adjustments, Measurement of horizontalangle – Method of repitition, Method of reiterition – Uses of theodolities – Errors intheodolite or Permanent adjustments of a theodolite – Identification – Rectifying the errors.

UNIT - II

Traversing **-** Open and closed traverse – Closing errors, Balancing the error –Bowditch method – Transit method, Omitted measurements – Gales traverse table orTrigonometric levelling – Elevation of top of the tower - same plane - Different planes – Axissignal correction.

UNIT - III

Tacheometry– Principle of techeometry – Stadia methods – Fixed hair method – Movablehairmethod – Tangential method – Subtanse bar – Beaman"s stadia, Arc – Reductiondiagrams or Triangulation – Classification-intervisibility of station – Signals and towers-baseline measurements – Corrections – Satellite station and Reduction to centre – Basenet.

UNIT – IV

Curves – Simple curves – Elements of simple curves – Methods of setting simple curves – Rankines method – Two theodolite method – Obstacles in curve setting – Compound curves– Elements of compound curves or Reverse curves – Elements of reverse curve –Determination of various elements – Transition curves – Ideal shape – Spiral transitioncurves - length of transition curve - Setting out methods.

UNIT- V

Total Station Surveying: Electronic Theodolite, Electronic Distance Measurements, Total Station, Errors in measurements, Advantages, Disadvantages, Applications;

Modern surveying and mapping: GPS survey"s – Introduction, Errors in GPS, Positioning methods, classification of GPS surveying, applications, advantages and disadvantages, photogrammetric surveying; sensors & platforms, aerial photogrammetry, orthophotography, topographic map, digital maps, DEM, GIS, Advantages & Disadvantages of photogrammetric surveying.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE 2205	
Course Title: SURVEYING – II	
CO-1	Appreciate the importance of Theodolite in Surveying
CO-2	Apply Concepts of Tachometry in Surveying.
CO-3	Construct the Curves in Highways, road construction and canal works.
CO-4	Use the RS and GIS in designing
CO-5	Use the Total Station in Surveying.

SYLLABUS : REMOTE SENSING & GIS(B17 CE 2206)

UNIT-II: Image Analysis

Introduction, elements of visual interpretations, Digital Image Processing - Image preprocessing, Image rectification, Image enhancement, Image classification: Supervised classification,Unsupervised classification.

UNIT-III: Geographic Information System(GIS)

Introduction, key components, application areas of GIS, Spatial data models: Raster data models,Vector data models, Raster versus Vector, Data input methods, Map projections.

UNIT-IV: RS & GIS Applications - General

Land Cover and Land Use, Agriculture, Forestry, Geology, Geomorphology, Urban applications.

UNIT-V: RS and GIS applications in Civil Engineering

Flood zoning and mapping, Groundwater prospects and Potential Recharge Zones, WatershedManagement.Environmental Impact Assessment.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE 2206	
Course Title: REMOTE SENSING & GIS	
CO-1	Be familiar with ground, air and satellite-based sensor platforms.
CO-2	Interpret the aerial photographs and satellite imageries
CO-3	Create and input spatial data for GIS application
CO-4	Apply RS and GIS concepts in water resources engineering.

SYLLABUS :SURVEYING FIELD WORK(B17 CE 2207)

1. Chain Surveying: Finding the distance between inaccessible points by making use of chain,cross staff, tape, ranging rods; Arrows and field problems of obstacles to chaining.
2. Compass Survey: Finding the distance between inaccessible points by making use ofcompass, tape and ranging rods.
3. Plane Table Survey: Finding the distance between inaccessible points by making use of planetable, its accessories-Ranging rods and tape.
4. Levelling: Introduction to fly levelling-Booking the readings by height of collimation methodand by rise and fall method-To find closing error.
5. Levelling: L.S. & C.S levelling for an open traverse
6. Theodolite: Distance between two in-accessible points by theodolite
7. Contour mapping using total station
8. Height of remote point using total station
9. Position of hidden point using total station
10. Area & volume measurement using total station

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE2207	
Course Title: SURVEYING FIELD WORK	
CO-1	Apply the linear measurement in simple Boundary Surveys.
CO-2	Identify direction of any line using compass survey.
CO-3	Relate the importance of Theodolite in Surveying
CO-4	Apply Concepts of Tachometry in Surveying.
CO-5	Use the Total Station in Surveying.

SYLLABUS :FLUID MECHANICS LAB – I(B17CE2208)

1. Study of Small orifice, by constant head method and Time of emptying a tank through asmall orifice.
2. Study of Cylindrical mouthpiece by constant head method and Time of emptying a tankthrough a cylindrical mouthpiece.
3. Study of floating body and determination of Meta -centric Height.
4. Study of surface profiles in Free and Forced Vortex motions.
5. Study of Venturimeter.
6. Study of Orifice meter.
7. Study of Flow nozzle meter.
8. Study of Sharp – crested full width and contracted weirs.
9. Study of V-notch and Trapezoidal notch.
10. Study of Broad-crested weir.
11. Study of Frictional Resistance in pipes.
12. Study of types of flow in pipes

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CE2208	
Course Title:FLUID MECHANICS LAB – I	
CO-1	Define and Measure Fluid Properties.
CO-2	Illustrate Flow Measuring Devices used in pipes, channels and Tanks.
CO-3	Analyze characteristics of broad crested weir.
CO-4	Illustrate the characteristics of surface profiles in free and forced vibrations.
CO-5	Compare sharp crested full width and contracted weirs.

SYLLABUS :INDUSTRY ORIENTED TECHNOLOGY LAB(B17 CE 2209)

ADVANCED COMPUTATION SURVEYING / GEOINFORMATICS / GEOMATICSENGINEERING

1. Transferring and Drafting the collected raw data from total station survey using AutoCAD.
2. Computation on drafted data using AutoCAD.
3. Developing Contour using raw data from total station using surfer software.
4. Visual Interpretation of standard FCC (False color composite).
5. Digitization of physical features on a map / image using GIS software.
6. Coordinates measurement using GPS.
7. Field data collection under national land use / land cover mapping on 1:120000 scale usingtemporal AWIFS data.
8. Asset Mapping of village using Bhuvans Panchayat Moblie App.

SYLLABUS :ENGLISH PROFICIENCY-II(B17 BS 2206)

(Common to All Branches)

UNIT-1:SPEAKING

Analyzing
proverbs
Enactment of One-
act play

UNIT-2:READING

Reading Comprehension
Summarizing Newspaper
Article

UNIT-3:WRITING

Note Taking &Note
MakingPrecis
Writing
Essay
Writing
Letter
Writing
Picture
Descriptio
n
Literary Appreciation– Learning the Language of Literature

UNIT-4:VOCABULARY

Indian-origin English Words
Phrasal Verbs for Day-to-Day
CommunicationCommonly used
Idiomatic Expressions

UNIT-5:PROJECT

Research Writing

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2206	
Course Title: ENGLISH PROFICIENCY-II	
CO-1	Develop the skills of taking and making notes.
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively.
CO-4	Learn and practice the skills of Research writing.
CO-5	Communicate well through various forms of writing.
CO-6	Be confident in giving presentations and dealing with people.

Regulation: R17							III / IV - B.Tech. I- Semester		
CIVIL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Course Code	Course Name	Category	Cr.	L	T	P	Int. Marks	Ext. Marks	Total Marks
B17 CE3101	Structural Analysis -II	BS	3	3	1	--	30	70	100
B17 CE3102	Reinforced Concrete Structures -I	ES	3	3	1	--	30	70	100
B17 CE3103	Steel Structures- I	ES	3	3	1	--	30	70	100
B17 CE3104	Geotechnical Engineering -I	ES	3	3	1	--	30	70	100
B17 CE3105	Fluid Mechanics -II	ES	3	3	1	--	30	70	100
B17 CE3106	Estimation & Quantity Surveying	ES	3	3	1	--	30	70	100
B17 CE3107	Environmental Engineering Lab	ES	2	--	--	3	50	50	100
B17 CE3108	Fluid Mechanics LabII	ES	2	--	--	3	50	50	100
B17 CE3109	Geographic Information SystemsLaboratory	ES	1	--	--	2	50	50	100
B17BS3101	Problem Solving & Linguistic Competence	BS	1	--	3	--	30	70	100
B17BS3105	IPR & Patents		--	--	2	--	--	--	--
		TOTAL	**24**	**18**	**11**	**8**	**360**	**640**	**1000**

CIVIL ENGINEERING

SYLLABUS:STRUCTURAL ANALYSIS – II(B17CE3101)

UNIT-I Analysis of statically indeterminate trusses
Analysis of statically indeterminate trusses (having not more than 7 members and 3 supports) containing (a) external redundant supports (b) internal redundant members using (i) method of consistent deformation of unit load method (ii) Castigliano‟stheorem – II.

UNIT-II Analysis of statically indeterminate frames
Analysis of statically indeterminate Non Sway & Sway frames(single storey, single bay portal frames only) using (i)slope-deflection method (ii)moment distribution method (iii) Kani‟s method.

UNIT-III Arches
Arches: Introduction, Geometrical properties, Arch action, Normal thrust, radial shear and bending moment in three hinged and two hinged parabolic and segmental arches. Effects of yielding of supports, rib-shortening and temperature changes

UNIT-IV Cables and Suspension Bridges
Cables and Suspension Bridges:Introduction, Properties of a suspended cable, Stresses in loaded cables with supports at the same and different levels. Length of cable, support system, two& three hinged stiffening girders.

UNIT-V Matrix methods of structural analysis
Introduction to matrix methods of structural analysis (very elementary treatment only) static indeterminacy, kinematic indeterminacy, flexibility and stiffness method for two span and two degree continuous beams only.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE3101	
Course Title: STRUCTURAL ANALYSIS – II	
CO-1	Student should be able to understand and analyse the statically indeterminate trusses by using method of consistent deformation and Castigliano's theorem– II
CO-2	Analyse the statically indeterminate rigid frame by Slope Deflection Method, Moment Distribution Method, Kani's Methods and Column Analogy Method.
CO-3	Analyze three hinged, two hinged arches and cables and suspension bridge with Two hinged and Three hinged Stiffening Girder.
CO-4	Analyse suspension cables support are at the same level and different levels.
CO-5	To develop stiffness matrix and flexibility matrix for two span continuous beams by direct method.

SYLLABUS:REINFORCED CONCRETE STRUCTURES-I(B17CE3102)

General: Loading standards as per IS 875, Grades of steel and cement, Introduction to basic design concepts like Working Stress Method (W.S.M), Ultimate Load Method (U.L.M) and Limit State Method (L.S.M.).

Limit State of Collapse: Introduction, Characteristic load and strengths, Design values, Partial safety factors Loads and materials, Stress-Strain characteristics of concrete and steel.

UNIT-I

Limit State of Collapse in Flexure: Assumption in analysis at Limit State of Collapse in Flexure, Limiting depth of neutral axis. Concrete stress block in compression. Under reinforced, Balanced and over reinforced sections. Analysis of singly reinforced rectangular sections, analysis of singly reinforced flanged section, analysis of doubly reinforced rectangular sections. Code requirement for design of flexural reinforcement are effective span, concrete cover, spacing of reinforcing bars, minimum and maximum areas of flexural reinforcement, requirements for deflection control, general guide lines for choosing beam size. Design of singly and doubly reinforced rectangular sections. Estimation of Effective flange width, Design of flanged beams (T-Beams),

UNIT-II

Limit State of Collapse in Shear: Shear stresses in homogeneous rectangular beam, modes of cracking, shear transfer mechanisms, shear span/depth ratio, shear failure modes. Calculation of nominal shear stress, critical sections for shear design, Design shear strength of concrete in beams with and without shear reinforcement. Types of shear reinforcement, Factors contributing to ultimate shear resistance, limiting ultimate shear resistance. Shear resistance of web reinforcement (Truss analogy), minimum shear reinforcement. Design of shear reinforcement in beams as per IS Code 456. Enhanced shear near supports. Steel detailing.

Limit State of Collapse in Torsion: Need for torsional reinforcement, Reinforcement for torsion in RC beams, design strength in torsion combined with flexure and IS code provisions fordesign of longitudinal reinforcement, design strength in torsion combined with shear and IS codeprovisions for design of transverse reinforcement, distribution of Torsional reinforcement. Design of rectangular section for combined bending shear and torsion. Detailing of torsion reinforcement

Limit State of Collapse in Bond: Concept of bond, Code requirement for bond, flexural bond, anchorage bond, development length. Bends, Hooks and Mechanical anchorages.Splicing of reinforcement, Lap Splices, Welded Splices and Mechanical Connections.

UNIT-III

Design of one way slabs : Behaviour of one-way slabs, general considerations for slabs,minimum flexural reinforcement in slabs, deflection control by limiting Span/Depth ratio.Design of simply supported one way slabs and design of continuous one way slabs using moment coefficient, detailing of reinforcement in one-way slabs.

Design of two way slab: Behaviour of two-way slabs, design of wall supported two-way slabs, slab thickness based on deflection control criterion, Uniformly loaded and simply supported rectangular slabs (Rankine-Grashoff theory), Uniformly loaded restrained rectangular slabs usingIS code 456 provisions. Detailing of flexural reinforcement and torsional reinforcement. Shearforce in uniformly loaded two-way slabs.

UNIT-IV

Limit State of Collapsein Compression: Classification of columns based on type of reinforcement, type of loading and slenderness ratios. Estimation of effective length of a column- definition of effective length- unsupported length.Effective length ratios for idealized boundary conditions-Code recommendations for idealized boundary conditions.Code requirements on slenderness limits, minimum eccentricities and reinforcement. Design of short column under axial compression-condition of axial loading- behaviour under ultimate loads-Tied columns- Spiral columns. Design strength of axially loaded short columns. Design of Short columns subjected to combined axial load and uniaxialmoments by using design hand book SP:16. Designof Short columns subjected to combined axial load and biaxialmoments by using design hand book SP:16

UNIT-V

Design of Footings: Types of footing-Isolated footings, Soil pressures under isolated footings-Allowable soil pressure, Distribution of base pressure- Concentrically loaded footings, Instability problems-Overturning and sliding. General design considerations and Code requirements- Factored soil pressure at ultimate limit state, general design considerations, Thickness of footing base slab, Design for Shear, design for Flexure, Transfer of force at Column Base. Design of isolated square and Rectangular footings concentrically loaded.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE 3102	
Course Title: REINFORCED CONCRETE STRUCTURES-I	
CO-1	Analyze and design the flexural members.
CO-2	Design the reinforced concrete beams subjected to shear only and also combined action of shear and torsion.
CO-3	Distinguish between the behavior of one way and two-way actions in slab and familiarize to design of two way slabs whose corners restrained and not restrained from lifting up.
CO-4	Design the compression members.
CO-5	Design the footing and staircase.

SYLLABUS:STEEL STRUCTURES-I(B17CE3103)

UNIT-I

Fundamental Concepts of limit state design of structures, Different types of rolled steel sections available to be used in steel structures. Stress – Strain relationship for mild steel.

Bolted connections: Behaviour of bolted joints, Design strength of ordinary black bolts, high strength friction grip bolts, Simple connections.

UNIT-II

Welded Connections: Introduction ,welding processes, Advantages of welding, Types and properties of welds, Types of joints, weld specifications as per IS 800:2007 code provisions, Types of weld defects Design of lap joints and butt joints subjected to axial load by using fillet and butt welds.

UNIT-III

Tension members: Types of tension members, slenderness ratio, displacement of tension members, behaviour of tension members, modes of failure, factors affecting strength of tension members, design of tension members, Lug angles.

UNIT-IV

Compression members: Possible failure modes, behaviour of compression members, Effective length, radius of gyration and slenderness of compression members, Allowable stresses in compression, Design of axially loaded compression members, built up compression members with lateral supporting system such as lacing and battened.

UNIT-V

Beams: Beam types, section classifications, lateral stability of beams, Allowable stress in bending, Shear and Bearing stresses, Effective length of compression flange, Laterally supportedand unsupported beams.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE 3103	
Course Title: STEEL STRUCTURES-I	
CO-1	Design of simple connections with bolted connections.
CO-2	Design of simple connections with welded connection.
CO-3	Design of tension members subjected to axial force
CO-4	Design of compression axially loaded members as built-up columns
CO-5	Design the laterally supported and unsupported beams as per I.S code.

SYLLABUS:GEOTECHNICAL ENGINEERING-I(B17CE3104)

UNIT-I

Introduction: Historical development, Soil Formation, Minerals in clays and sand, Soil Structure, Physical properties of Soil: Void ratio, Porosity, Degree of Saturation, Water content, Specific Gravity, weight –volume Relationships, Relative density, Consistency limits: Determination and consistency indices, Activity, Sensitivity and Thixotropy. Mechanical analysis and Soil Classification: Sieve analysis, Stoke"s law and hydrometer analysis. Unified soil classification, Indian Standard Soil Classification Systems, Field Identification of Soils

UNIT-II

Soil Hydraulics: Types of soil water, capillary rise and surface tension, Darcy"s law and its limitations, constant head and variable head permeability tests, Factors effecting Coefficient of permeability, permeability of stratified soils. Total, neutral and effective stresses, Effective Stress Principle, Upward flow conditions, quick sand conditions and critical hydraulic gradient.

UNIT-III

Stress Distribution in Soils: Bousinesq"s theory for determination of vertical stress, assumptions and validity, rectangular and circular loaded areas, Pressure Bulb and Influence diagrams, westergaard"s theory, Newmarks influence chart - construction and use, 2:1 approximate method, contact pressure distribution beneath footings.

UNIT-IV

Compaction: Mechanism of compaction, Factors effecting compaction: water content, compaction effort, Type of soil. I.S Light and I.S Heavy compaction tests, Effect of compaction on soil Properties, Field compaction: compaction Equipment and Evaluation of field Compaction. **Consolidation**: Basic Definitions: compression index, coefficient of compressibility and coefficient of volume decrease. Terzaghi"s one dimensional consolidation theory - assumption, Derivation of differential equation and Solution, Oedometer Test, Determination of coefficient of consolidation by time fitting methods, initial compression, primary compression and secondary compression, determination of preconsolidation pressure. Normally consolidated, over consolidated and under consolidated clays.

UNIT-V

Shear Strength of Soils: Stress at a point, Mohr circle of stress, Mohr coulomb failure theory,shear parameters, laboratory shear tests – shear box, triaxial and unconfined compression tests, laboratory and field vane shear tests, Sensitivity of clays, Types of shear tests on drainageconditions, shear strength of sands, critical void ratio and dilatancy, Factors affecting shearstrength of clays and sands, Total stress analysis and Effective stress analysis

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE 3104	
Course Title: GEOTECHNICALENGINEERING-I	
CO-1	Know the fundamental relationships between different parameters of soil mass and classify different types of soils along with identifying their properties (K3).
CO-2	Estimate Effective stresses and permeability of soils (K3).
CO-3	Estimate stress distribution in soil for different Load conditions (K3).
CO-4	Appreciate the processes of compaction and consolidation and apply them to field problems(K3)
CO-5	Identify shear strength parameters for different conditions (K3).

SYLLABUS: FLUID MECHANICS- II(B17CE3105)

UNIT-I

Dimensional Analysis and Similitude: Dimensional Homogeneity **-** Methods of Dimensional Analysis – Rayleigh"s Method – Buckingham"s π theorem – Superfluous and Omitted Variables
- Similitude – Model Analysis – Dimensionless numbers – Similarity Laws – Model testing of partially submerged bodies – Types of models.

Boundary Layer Theory: Introduction – characteristics of laminar boundary layer – boundary layer growth over a flat plate (without pressure gradient) – Boundary thicknesses – Stability parameter – Turbulent boundary layer – boundary layer separation – Boundary layer on rough surfaces – laminar sub layer.

UNIT – II

Flow past submerged bodies: Introduction – Types of Drag – Drag on a sphere – Drag on a cylinder –Von Karman Vortex Trail – Drag on a flat plate – Development of Lift on immersed circular cylinder – Magnus effect.

Impact of Jets: Impulse momentum equation – Momentum Correction factor, Force on Stationary flat plate – moving flat plate - Force on Stationary curved vanes – moving curved vanes.

UNIT – III

Hydraulic Turbines: Introduction - Classification based on Head, Discharge, Hydraulic Action – Impulse and Reaction Turbines, Differences between Impulse and Reaction Turbine, Choice of Type of Turbine, Component Parts & Working principle of a Pelton Turbine, Francis Turbine - Velocity Triangles - Hydraulic and Overall efficiencies.

Performance of turbines: Performance under Unit head, power and speed – Performance under specific conditions - Specific Speed and its importance. Performance Characteristic Curves – Operating Characteristic Curves – Cavitation - Draft Tube.

UNIT – IV

Centrifugal Pumps: Types of Pumps – Selection Criterion – Comparison between Centrifugal & Reciprocating Pumps - Centrifugal Pumps – Component Parts & Working Principle – Classification of Centrifugal pumps - Cavitation – Maximum Suction lift – NPSH. Specific Speed of pumps – Performance Characteristics of Centrifugal Pumps – Dimensionless characteristics – Constant efficiency curves of Centrifugal Pumps

Reciprocating Pumps: Component Parts – Working Principle of single acting and double acting reciprocating pumps – Discharge Co-efficient, Volumetric efficiency and Slip. Work done and Power Input – Indicator Diagram, Effect of acceleration and friction on Indicator Diagram - Air Vessels.

UNIT – V

Flow through Open Channels: Classification of open channels, Uniform Flow: Chezy"s and Manning"s formula, Hydraulic mean depth, hydraulic radius. Most economical trapezoidal and rectangular channel section – Specific energy, Critical Flow.

Steady Rapidly Varied Flow: Hydraulic Jump in a horizontal rectangular channel, Specific force Computation of energy loss.

Course Outcomes for Third Year First Semester Course	
Course Code:B17 CE 3105	
Course Title: FLUID MECHANICS- II	
CO-1	Apply the principles of modelling pumps, turbines, propellers using various dimensionless numbers.
CO-2	Determine discharge and design most economical channel section for uniform flow in open channels.
CO-3	Use momentum and energy principles for design of turbines and pumps.
CO-4	Recommend suitable type of turbines and pumps for the given project.

SYLLABUS:ESTIMATION & QUANTITY SURVEYING(B17CE3106)

UNIT-I

Introduction: Definition, purpose and Importance of estimation, Standard units, Units of measurement of different items of work; Quantity surveying, accuracy and Errors in estimation; Different types of estimates, Data required for preparation of estimate, Different technical terms in estimation- Contingencies, Work charged Establishments, measurement book, schedule of rates and related terms in the estimate, different types of approvals. Plinth area and related terms used in the estimation of various structures, rules and methods of measurements of different works.

UNIT-II

Detailed estimate of buildings: Different items of work in building; Principles of taking out quantities, detailed measurement form; long wall and short wall method of building estimate, Centre line method of building estimate. Estimation of Load bearing wall and an RCC framed buildings; Bar bending schedule- Beams, Slabs

UNIT-III

Specifications : Meaning, purpose, types of specifications, general specification, detailed specifications of different items of buildings and other structures – Rate analysis –Data sheet for materials and various items of work in buildings and other structures, schedule of rates, abstract estimate of buildings.

UNIT-IV

Estimate of earth work in roads; different formulae for calculations, estimate of metalled road, Estimate of culverts

UNIT-V

Valuation of buildings; purpose, different methods of building valuation; different terms used invaluation and their meaning, valuation of government and private properties, Rent fixation

Course Outcomes for Third Year First Semester Course	
Course Code:B17 CE 3106	
Course Title: ESTIMATION & QUANTITY SURVEYING	
CO-1	List out various components, estimations and units of measurement for different works
CO-2	Apply the method of building estimate to find out the quantities of various items of work
CO-3	Determine the rate per unit of various items of work and their specifications
CO-4	Explain the estimation of various roads and related items
CO-5	Select various methods to find out the valuation of a property

SYLLABUS: ENVIRONMENTAL ENGINEERING LAB(B17CE3107)

List of experiments

1. pH
2. Electrical conductivity
3. Turbidity
4. Jar test
5. Hardness
6. Acidity
7. Alkalinity
8. Available chlorine and Residual chlorine
9. Estimation of total solids, suspended solids, dissolved solids
10. DO
11. BOD and COD
12. Chlorides

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE3107	
Course Title: ENVIRONMENTAL ENGINEERING LAB	
CO-1	Determine physical properties of water
CO-2	Determine the turbidity and hardness of water
CO-3	Determine COD and BOD of water
CO-4	Estimate concentration of acidity and alkalinity
CO-5	Estimate chloride content of water

SYLLABUS: FLUID MECHANICS LAB– II(B17CE3108)

1. Study of Characteristics of a hydraulic jump – To measure and draw (E1-E2)/E1 vs F1 and Lj
   /y2 vs F1, and compare with theoretical results wherever possible.
2. Study of Rugosity coefficients in an open channel flow.
3. Study of Drag characteristics of a circular cylinder with its axis normal to the direction of flow.
   (a) To measure the pressure distribution on the surface of a cylinder and plot the dimensionless pressure variation around the cylinder and compute the pressure drag.
   (b)To measure the velocity variation in the wake of the cylinder, velocity of approach, and compute the total drag by momentum principle.
4. Study of performance characteristics of a centrifugal pump – To measure the discharge, head developed, and power input at various discharges for centrifugal pump and draw the performance characteristics.
5. Study of performance characteristics of a reciprocating pump – To measure the discharge, head developed, and power input at various discharges for reciprocating pump and calculate percentage slip and efficiency.
6. Study of performance characteristics of a Pelton turbine – To measure the discharge, head difference across the turbine, the brake load, speed of turbine for various discharges and drawthe performance characteristics.
7. Study of performance characteristics of a Francis turbine – To measure the discharge, head difference across the turbine, the brake load, speed of turbine for various discharges and drawthe performance characteristics.
8. Study of impact of a jet on flat and curved vanes.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE3108	
Course Title: FLUID MECHANICS LAB– II	
CO-1	Determine the coefficient of impact on a flat plate and curved vane by comparing the theoretical and actual forces by impact.
CO-2	Analyze the working of the centrifugal pump and develop the characteristics of power input, head and efficiency under various discharges and plot the characteristic curves.
CO-3	Analyze the working of the reciprocating pump and develop the characteristics of power input and discharge and efficiency under various heads and plot the characteristic curves.
CO-4	Determine the performance characteristics of pelton wheel turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed.
CO-5	Determine the performance characteristics of Francis turbine and develop the characteristic curves of unit discharge, unit power and unit head under varying unit speed.

SYLLABUS:GEOGRAPHIC INFORMATION SYSTEMS LABORATORY(B17CE3109)

EXCERCISES IN GIS:

1. Digitization of Map/Toposheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Developing Digital Elevation model

GIS:

SOFTWARES:

1. ArcGIS 10.1
2. ERDASImagine9.3

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE3109	
Course Title: GEOGRAPHIC INFORMATION SYSTEMS LABORATORY	
CO-1	Assign appropriate datum and projection systems for the given data
CO-2	Pre-process the raw data to make it suitable for overlaying with various themes
CO-3	Create thematic layers by using digitization techniques and attaching attribute data
CO-4	Visualize and interpret digital elevation model

SYLLABUS:PROBLEM SOLVING & LINGUISTIC COMPETENCE(B17BS3101)
(Common to all Branches)

Part-A: Verbal and Soft Skills-I

Grammar: (VA**)**
Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns-number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause , conditional and relative clauses), phrases(use of the phrases, phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees of comparison, modifiers, determiners, identifying errors in a given sentence, correcting errors in sentences.

Vocabulary: (VA)
Synonyms and synonym variants(with emphasis on high frequency words), antonyms and antonym variants(with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meanings ofthe same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning: (VA)
Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage: (VA)
Sentence completion (with emphasis on signpost words and structure of a sentence), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:
Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis –Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for Goal Setting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - Stress Management, CV Making and CV Review.

Part-B: Quantitative Aptitude -I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, Finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, Introducing the concept of ratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work, Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of time and distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.

Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships, shares and dividends
Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking, directions Problems of how to find the next number in the series, Finding the missing number and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directions north, south, east, west.

Data sufficiency, Syllogisms Easy sums to understand data sufficiency, Frequent mistakes whiledoing data sufficiency, Syllogisms Problems.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3101	
Course Title: PROBLEM SOLVING & LINGUISTIC COMPETENCE	
	PART-A (Verbal and Soft Skills-I)
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
	PART-B (Quantitative Aptitude –I)
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-2	Accurate solving problems on time and distance and units related solutions.
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry.
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies.

SYLLABUS:IPR & PATENTS(B17BS3105)

(Common to CE, EEE & ME)

UNIT I

Intellectual Property Law: Basics - Types of Intellectual Property - Innovations and Inventions - Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Compliance and Liability Issues

UNIT II

Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership–Copyright Formalities and Registration – Limitations – Infringement of Copyright - Plagiarism and difference between Copyright infringement and Plagiarism

UNIT III

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance– Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT IV

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3105	
Course Title: IPR& PATENTS	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Regulation: R17										**III / IV - B.Tech. II- Semester**
CIVIL ENGINEERING (under Choice Based Credit System / Elective Course System)										
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)										
Course Code	**Course Name**	**Category**	**Cr.**	**L**	**T**	**P**	**Int. Marks**	**Ext. Marks**	**Total Marks**	
B17 CE3201	Reinforced Concrete Structures-II		3	3	1	--	30	70	100	
B17 CE3202	Steel Structures-II		3	3	1	--	30	70	100	
B17 CE3203	Geotechnical Engineering-II		3	3	1	--	30	70	100	
B17 CE3204	Transportation Engineering-I		3	3	1	--	30	70	100	
B17 CE3205	Air pollution and Control		3	3	1	--	30	70	100	
#OE	Open Elective		3	3	1	--	30	70	100	
B17 CE3209	Geotechnical Engineering Lab		2	--	--	3	50	50	100	
B17 CE3210	Concrete TechnologyLab		2	--	--	3	50	50	100	
B17BS3201	Employability Skills		1	--	3	--	30	70	100	
B17BS3202	Basic Coding		1	--	--	3	50	50	100	
TOTAL			**24**	**18**	**9**	**9**	**360**	**640**	**1000**	

Open Elective	B17CS3213	Data Base Management Systems
	B17CE3206	Alternative Energy Sources
	B17CE3207	Wastewater Management
	B17CE3208	Green Fuel Technologies

SYLLABUS:REINFORCED CONCRETE STRUCTURES – II(Code: B17CE3201)

UNIT I

Design of Retaining Walls: Types of retaining walls and their behavior, forces on retaining walls, Theories of Earth pressures-Rankine"s and Coulomb"s earth pressure theories (c and soils). Earth pressures and Stability requirements-Lateral earth pressures, Effect of surcharge ona level Backfill, Effect of water in the backfill. Stability requirements.Soil bearing pressure requirements.Drainage of retaining walls. Proportioning and Design of cantilever and counterfortretaining walls- position of Stem on base slab for economical design. Proportioning and Design of Elements of cantilever wall- Thickness of Base slab and Stem, design of stem, Toe and Heel Slab. Proportioning and Design of Elements of a counterfort wall- Thickness of various elements, design of stem, Toe and Heel Slab, Design of counterforts.

UNIT II

Water Tanks: Classification-Basis of Design-Permissible stress in concrete and steel in water tanks-Joints in tanks- Flexible joint-Joints of bottom slabs of tanks-Joints between wall and floor-Tanks resting on ground-Circular tank on ground with flexible joint between wall and the base slab Approximate design of circular tanks with walls restrained at the base-Rectangular tanks on ground-Analysis of a tank wall section subjected to bending moment and pull-Overheadtanks- Rectangular tank supported on masonry walls all round -Wind load analysis of columns and bracings of water tower-design of a square tank supported on columns and beams - Underground rectangular tanks.

UNIT III

Bridges: Components of a bridge in sub structure and super structure. Classification of bridges.Highway loading standards, kerbs, footpaths, railings, parapet loadings, Impact, wind, longitudinal forces.Design of solid slabs (casual reference to MOST drawings) Design of T-beam bridge deck slab, Longitudinal and Cross beams (casual reference to MOST drawings) Courbon"s theory.

UNIT IV

Design of Piles: Behaviour of piles. Static formula for pile capacity, dynamic pile formula, Pile groups. Structural design of piles-design of bored cast in situ piles (bearing and friction types), under reamed piles.

Design of Pile caps: Coderequirements for pile cap design Sectional method of design of pile cap, Strut-and-tie model for pile caps, Detailing of pile caps.

UNIT V

Design of Flat Slabs: Introduction, Proportioning of Flat slabs- Thickness of flat slabs, Drop panel, Column Heads, Shear Caps, Behaviour of flat slabs, Methods of Analysis-Direct Design Method, Equivalent Frame method, Transfer of Moments to column. Shear in Flat slabs- One-way and Two-way shear. Design procedure for flat slabs, Detailing of reinforcement.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE 3201	
Course Title: REINFORCED CONCRETE STRUCTURES – II	
CO-1	Distinguish between the behaviors of cantilever and counter fort retaining walls and design the cantilever and counter fort retaining walls.
CO-2	Design the reinforced concrete circular and rectangular water tanks.
CO-3	Design the reinforced concrete T-beam bridge.
CO-4	Design the piles and pile cap.
CO-5	Design the flats labs

SYLLABUS:STEEL STRUCTURES-II(B17CE3202)

UNIT-I

Column bases: Introduction, Types of column bases, Theoretical considerations, Allowable stress in bearing, Design of Slab base, Design of Gusset base as per IS 800: 2007.

UNIT-II

Plate Girders (Welded): Components of a plate girder, Economical depth, proportioning of web and flanges, shear buckling resistance of web by simple post critical and tension field methods, connection of flange angles to web and flange angles to flange plates. Web stiffeners: Intermediate Transverse Stiffeners and longitudinal stiffeners, Design of bearing stiffeners. End panel design, design of intermediate Transverse stiffeners, connections, Curtailment of Flanges.

UNIT-III

Water tanks: Introduction, permissible stresses in water tanks, Design of circular steel water tank: forces acting over the tanks, stresses in elevated circular tanks ,stresses in segmental and spherical bottoms, stresses in conical bottom, Design of circular girder (ring beam), stagging for circular steel tanks, stresses in columns, wind bracings.

UNIT-IV

Eccentric shear connections: Introduction, beam-columns connections, connections subjected to eccentric shear: welded seat connections: unstiffened seat angle connection and stiffened seat angle connections.

UNIT V

Bearings: Introduction,IS Code requirement for bearings, types of bearings, permissible stresseson bearings, Design of rocker and roller bearings using working stress method.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3202	
Course Title: STEEL STRUCTURES-II	
CO-1	Design of columns bases.
CO-2	Design components of a plate girder with and without stiffeners by using IS: 800-2007 code
CO-3	Design of circular water tank in working stress method.
CO-4	Design of beam-column connections subjected to eccentric shear connections.
CO-5	Design of end bearings.

SYLLABUS:GEOTECHNICAL ENGINEERING-II(B17CE3203)

UNIT-I

Subsoil Exploration: Methods of subsoil exploration Direct, semi direct and indirect methods,Soundings by Standard, Dynamic cone and static cone penetration tests, Types of Boring, Types of samples, Criteria for undisturbed samples, Transport and preservation of samples, Bore logs,planning of exploration programmes, report writing.

UNIT-II

Shallow Foundations: Factors effecting location of foundation and design considerations of shallow foundations. **Bearing Capacity**: Safe bearing capacity and allowable bearing pressure, General and local shear failures, Terzaghi‟s bearing capacity equations its modifications for square, rectangular and circular foundations, Factors affecting bearing capacity of Soil, Effect of water table on bearing capacity, IS Code method for Bearing capacity of footings, Allowable bearing pressure based on N-values, Field plate load tests, Settlement Analysis of shallow foundations

UNIT-III

Pile Foundations: Types, Construction, load carrying capacity of single piles in sands and clays (α-method) Dynamic Formula, Static formula, Pile load tests, Load carrying capacity of pile groups, Settlement Analysis of pile foundations. **Caissons:** Types of caissons, pneumatic caissons, Different shapes of well foundations, Relative advantages and disadvantages, Different Components of well and their function, Grip length, problems in well sinking and remedial measures

UNIT-IV

Stability Analysis of Slopes: Infinite and Finite Slopes, Stability Analysis of Infinite Slopes, different factors of safety, Types of Slope Failures – Toe, slope and Base failure, Stability Analysis of Finite slopes – Swedish Circle method, Friction Circle method, Fellenius method for location of Critical Slip Circle, Taylor‟s stability number

UNIT-V

Earth Pressure: Types of Earth pressure, Rankine‟s Active and passive earth pressure, Smooth Vertical wall with horizontal and inclined backfills. Coloumb‟s wedge theory, Culmans active earth pressure.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3203	
Course Title: GEOTECHNICAL ENGINEERING-II	
CO-1	Plan a detailed soil exploration programme. (K2)
CO-2	Apply various methods for estimating bearing capacity of different types of foundations. (K3)
CO-3	Estimate load capacity of single piles and groups of piles and know the theory aspects of well foundations (K3)
CO-4	Determine the stability of finite and infinite slopes. (K3)
CO-5	Calculate earth pressures on retaining walls using Rankine's and Coulomb's theories (K3)

SYLLABUS:TRANSPORTATION ENGINEERING – I(B17 CE 3204)

UNIT-I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans

– First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT-II

Highway Geometric Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical alignment-Gradients- Vertical curves.

UNIT-III

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; Road Accidents- Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; RoadTraffic Signs; Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and ChannelizedIntersections; Design of Traffic Signals –Webster Method –IRC Method.

UNIT-IV

Highway Materials: Subgrade soil: classification –Group Index – Subgrade soil strength –California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties –Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design. **Design Of Pavements:**Types of pavements; Functions and requirements of different componentsof pavements; Design Factors

Flexible Pavements:Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method

– Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted ConcretePavements.

UNIT-V

Highway Construction and Maintenance: Types of Highway Construction – Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements.

Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existingpavements

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE 3204	
Course Title: TRANSPORTATION ENGINEERING – I	
CO-1	Plan highway network for a given area.
CO-2	Determine Highway alignment and design highway geometrics
CO-3	Design Intersections and prepare traffic management plans
CO-4	Judge suitability of pavement materials and design flexible and rigid pavements
CO-5	Construct and maintain highways

SYLLABUS:AIR POLLUTION AND CONTROL(B17CE3205)

UNIT-I
Air Pollution and its definition – Factors influencing air pollution – Classification of pollutants particulates – Gases – sources of pollution – Air qualities standards – effects – Location of industries.

UNIT-II
Meteorology – Wind roses – lapse rates – mixing depth atmospheric dispersion – plume behaviour accumulation, estimation of pollutants – effective stack height.

UNIT-III
Air pollution effects on human beings, animals, plants and materials – Air pollution Episodes in India and Abroad.

UNIT-IV
Air Pollution Sampling and measurement Ambient air quality monitoring and stack monitoring, collection of particulate and gaseous pollutants: Isokenitic sampling: Ambient air quality survey.

UNIT-V
Control of air pollution – removal of pollutants – particulate and gaseous – Air pollution control equipments (units) such as setting chamber, cyclones, wet scrubbers/collectors, scrubbers, centrifugal scrubbers, spray towers, packed beds, electrostatic precipitators, after burners – absorption – adsorption – diffusion.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE 3205	
Course Title:AIR POLLUTION AND CONTROL	
CO-1	Explain the classification, sources and effects of air pollution [K2]
CO-2	Explain the different meteorological conditions that influence the dispersion of the pollutants [K2]
CO-3	Illustrate the plume behaviour for different atmospheric stability conditions [K2]
CO-4	Adapt various pollution control equipment's or methods to control the discharge of pollutants [K3]
CO-5	Measure the pollution levels by sampling and analysis [K5].

SYLLABUS:DATABASE MANAGEMENT SYSTEMS(B17CS3213)

(Common to CE & ME)(Open elective)

UNIT-I

Introduction: Database System Applications, Purpose of Database Systems, View of Data,Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems. Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus – Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus. SQL: Queries, Constraints, Triggers: Form of Basic SQL Query, UNION,INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases, Designing Active Databases..

UNIT-III

Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies-Reasoning about FDs,NormalForms,Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

UNIT-IV

Transaction Management: Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels. Concurrency Control: Lock–Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes. Recovery System-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of nonvolatile storage, Early Lock Release and Logical Undo Operations, Remote Backup systems.

UNIT-V

Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations. Tree-Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash- Based Indexing: Static Hashing,Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS3213	
Course Title: DATABASE MANAGEMENT SYSTEMS	
CO-1	Demonstrate the basic elements of a relational database management system.
CO-2	Ability to identify the data models for relevant problems.
CO-3	Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
CO-4	Apply normalization for the development of application software

SYLLABUS:ALTERNATIVE ENERGY SOURCES(B17CE3206)
(Open elective)

UNIT – I

Global and National Energy Scenario: Over view of conventional & renewable energy sources - need & development of renewable energy sources - Future of Energy Use, Energy for sustainabledevelopment - Potential of renewable energy sources - renewable electricity and key elements - Global climate change - CO2 reduction potential of renewable energy - concept of Hybrid systems.

UNIT – II

Solar Energy: Solar energy system - Solar Radiation – Availability - Measurement and Estimation - Solar Thermal Conversion Devices and Storage - Applications Solar Photovoltaic Conversion, applications of solar energy systems.

UNIT – III

Wind Energy: Wind Energy Conversion - Site selection, Types of wind turbines, wind Generation and Control. Nature of the wind, , factors influencing wind, wind data and energy estimation, wind speed monitoring, classification of wind, characteristics, applications of wind turbines, offshore wind energy – Hybrid systems, wind resource assessment, Betz limit, site selection, wind energy conversion devices. Wind mill component design, economics and demand side management, energy wheeling, and energy banking concepts. Safety and environmental aspects, wind energy potential and installation in India.

UNIT – IV

Biogas: Calorific value and composition of biogas – Bio energy systems – Biomass conversion processes – Thermo chemical conversion processes – biomass gasification – pyrolysis – liquefaction – anaerobic digestion – Urban waste to energy conversion – bio diesel production – Biomass energy programme in India.

UNIT – V

Ocean Energy – Principle of Ocean Thermal Energy Conversion (OTEC) – tidal energy conversion – Scheme of development of tidal energy
Hydro power plants- types of turbines – estimation of primary and secondary powerGeothermal Energy – Geothermal power plants

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3206	
Course Title:ALTERNATIVE ENERGY SOURCES	
CO-1	Summarize the need of renewable sources in Global scenario. [K2]
CO-2	Explain the solar thermal conversion processes. [K2]
CO-3	Explain the wind energy conversion techniques. [K2]
CO-4	Explain the biomass energy conversion methodologies. [K5]
CO-5	Analyze the principle of ocean thermal energy conversion system. [K4]

SYLLABUS:WASTEWATER MANAGEMENT(B17CE32070)

(Common to CE & ME)
(Open elective)

UNIT – I

Water uses by industry – Sources of water for industries – Characteristics of industrial wastes – Industrial water requirements – quality and quantity

UNIT – II

Waste reduction – Volume reduction – Classification of wastes – Equalisation- Neutralisation – Floatation – Precipitation – Heavy metal removal - adsorption – Aerobic and anaerobic biological treatment – reed bed technology

UNIT - III

Measurement of industrial waste water flow – waste water characterization - Advanced waste reduction technologies – Ozonation – Membrane technologies – Ion exchange – Nutrient removal – recycling, reuse and resources recovery

UNIT – IV

Waste disposal methods- land treatment – water bodies, rivers, oceans – problems of disposal – Common effluent treatment plants- advantages and disadvantages – recirculation of industrial wastes – Effluent disposal methods – sludge treatment - disposal

UNIT – V

Manufacturing process and origin, characteristics, effects and treatment methods of liquid wastefrom different industries – steel – fertilizers – textiles – paper and pulp industries – oil refineries
– coal and gas power plants- tanneries – sugar – textiles – distillery – dairy – food processing - distilleries

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE 3207	
Course Title: WASTEWATER MANAGEMENT	
CO-1	Define the quality of industrial wastes. [K1]
CO-2	Explain various industrial waste treatment processes. [K2]
CO-3	Outline the advanced treatment techniques available for industrial wastes. [K2]
CO-4	Explain the sludge reduction and disposal methodologies. [K2]
CO-5	Analyse the waste effluent treatment from different case studies. [K4].

SYLLABUS: GREEN FUEL TECHNOLOGIES(B17CE3208)

(Open elective)

UNIT-I

Introduction:

Definition of Green Fuel, Classification, advantages and effects of green fuel-Plant based Biofuels- Thermochemical conversion of biomass to liquids & gaseous fuels.

UNIT-II

Bio Ethanol Production Technologies:

Bio Ethanol from crops- cane sugar-Sugar Fermentation Process- Bio ethanol from starchybiomass- Bio Ethanol from agricultural waste- Banana pseudo stem as lignocellulosic substrate.

UNIT-III

Bio Diesel Production Technologies:

Bio diesel from Algae: Algae culture-challenges-Algae culture for biodiesel production-biodiesel production with super critical fluid technologies.

UNIT-IV

Bio Diesel From Different Plant Seeds:

Chemical process -Palm oil diesel production- Bio diesel production from rubber seed oil &other vegetable oils.

UNIT-V

Biogas Production From Biomass:

Microbial production of methane(Biogas)- Biogas production by Biogas plant & other biogas technologies in India.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3208	
Course Title: GREEN FUEL TECHNOLOGIES	
CO-1	Classify various types of green fuels. [K2]
CO-2	Examine the production of bio ethanol using fermentation process.[K3]
CO-3	Explain the generation of bio diesel using algae species. [K2]
CO-4	Interpret the production of bio diesel from plant seeds. [K2]
CO-5	Explain the production of biogas from biogas plant. [K2]

SYLLABUS:GEOTECHNICAL ENGINEERING LAB(B17CE3209)

LIST OF PROGRAMS

1. Atterberg limits
2. Field density by Core Cutter method.
3. Field density by Sand replacement method
4. Grain size analysis (Sieve analysis)
5. Hydrometer analysis.
6. Specific gravity by pycnometer/density bottle method.
7. Permeability of soil – Constant headmethod.
8. Permeability of soil – Variable head method
9. IS light/heavy compaction.
10. CBR test/plate bearing test
11. Unconfined compression test
12. Triaxial compression test (u-u test)
13. Direct shear test
14. Vane shear test
15. Relative density.

***Atleast12experiments must be done**

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3209	
Course Title: GEOTECHNICAL ENGINEERING LAB	
CO-1	Identify the physical properties of soil and classify various types of soil.(K2)
CO-2	Determine the permeability of soil.(K3)
CO-3	Determine compaction characteristics of soils and estimate in-situ density of soil.(K3)
CO-4	Determine the shear strength parameters of soils by various methods.(K3)
CO-5	Estimate the California Bearing Ratio (CBR) of a soil.(K3)
CO-6	Determine the relative density of a coarse-grained soil.(K3)

SYLLABUS:CONCRETE TECHNOLOGY LAB(B17CE3210)

LIST OF EXPERIMENTS

TESTS ON CEMENT

1. Fineness of cement
2. Specific gravity of cement
3. Normal consistency of cement
4. Initial and final setting time
5. Compressive strength of cement for different grades of cement.

TESTS ON AGGREGATE

6. Specific gravity and unit weight of coarse and fine aggregates
7. Sieve analysis of coarse and fine aggregates and classification as per IS 383.
8. Bulking characteristics of sand

TESTS ON FRESH CONCRETE

9. Workability tests on fresh concrete by using:(a)Slump cone
   (a) Compaction factor apparatus(c)Flow table
   (d)Vee-Bee consistometer

TESTS ON HARDENED CONCRETE

10. Strength tests on hardened concrete
    (a) Compressive strength
    (b) Split tensile strength
    (c) Flexural strength

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CE3210	
Course Title: CONCRETE TECHNOLOGY LAB	
CO-1	Conduct test and find consistency and fineness of cement.
CO-2	Examine the specific gravity of cement.
CO-3	Conduct test and determine the setting times of cement.
CO-4	Determine the compressive strength of cement.
CO-5	Determine the specific gravity of coarse aggregate and fine aggregate.
CO-6	Determine the fineness modulus of coarse aggregate and fine aggregate.
CO-7	Determine the bulking of sand.
CO-8	Understand and determine workability of concrete by slump, compaction factor, flow table and Vee – Bee tests.
CO-9	Evaluate hardened properties of concrete like compressive strength, split tensile strength and flexural strength.

SYLLABUS:EMPLOYABILITY SKILLS(B17BS3201)

(Common to all Branches)

UNIT -I (VA)
Sentence Improvement (finding a substitute given under the sentence as alternatives), Sentence equivalence (completing a sentence by choosing two words either of which will fit in the blank), cloze test (reading the written discourse carefully and choosing the correct options from the alternatives and filling in the blanks), summarizing and paraphrasing.

UNIT- II (VA)
Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the author„s intention of writing a passage), strategies for quick reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

UNIT- III (VA)
Punctuation, discourse markers, general Essay writing, writing Issues and Arguments(withemphasis on creativity and analysis of a topic), paragraph writing, preparing reports, framing a Statement of purpose„, ‗Letters of Recommendation„, business letter writing, email writing, writing letters of complaints/responses. picture perception and description, book review.

UNIT-IV (VA)
Just a minute sessions, reading news clippings in the class, extempore speech, telephone etiquette, making requests/suggestions/complaints, elocutions, debates, describing incidents and developing positive non verbal communication, story narration, product description.

UNIT-V (SS)
Employability Skills – Significance — Transition from education to workplace - Preparing a road map for employment – Getting ready for the selection process, Awareness about Industry / Companies – Importance of researching your prospective workplace - Knowing about Selection process - Resume Preparation: Common resume blunders – tips, Resume Review, Group Discussion: Essential guidelines – Personal Interview: Reasons for Rejection and Selection.

Part-B: Quantitative Aptitude-II

UNIT I: Averages, mixtures and allegations, Data interpretation Understanding of AM,GM,HM-Problems on averages, Problems on mixtures standard method. Importance of data interpretation: Problems of data interpretation using line graphs, Problems of data interpretation using bar graphs, Problems of data interpretation using pie charts, Problems of data interpretationusing others.

UNIT II:Puzzle test, blood Relations, permutations, Combinations and probability Importance of puzzle test, Various Blood relations-Notation to relations and sex making of family Tree diagram, Problems related to blood relations, Concept of permutation and combination, Problems on permutation, Problems on combinations, Problems involving both permutations and combinations, Concept of probability-Problems on coins, Problems on dice, Problems on cards, Problems on years.

UNIT III:Periods,Clocks, Calendars, Cubes and cuboids Deriving the formula to find the angle between hands for the given time, finding the time if the angle is known, Faulty clocks, History of calendar-Define year, leap year, Finding the day for the given date, Formula and method to find the day for the given date in easy way, Cuts to cubes, Colors to cubes, Cuts to cuboids, Colors to cuboids.

UNIT IV: Puzzles Selective puzzles from previous year placement papers, sitting arrangement, problems- circular arrangement, linear arrangement, different puzzles.

UNIT V: Geometry and Mensuration Introduction and use of geometry-Lines, Line segments, Types of angles, Intersecting lines, Parallel lines, Complementary angles, supplementary angles, Types of triangles-Problems on triangles, Types of quadrilaterals-Problems on quadrilaterals, Congruent triangles and properties, Similar triangles and its applications, Understanding about circles-Theorems on circles, Problems on circles, Tangents and circles, Importance of mensuration-Introduction of cylinder, cone, sphere, hemi sphere.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 BS3201	
Course Title: EMPLOYABILITY SKILLS	
	Part-A (Verbal Aptitude and Soft Skills-II)
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyse the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign Universities), letters of recommendation (for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, and respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during The course of their recruitment process.
	Part-B (Quantitative Aptitude-II)
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skilfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on.

SYLLABUS:BASIC CODING(B17BS3202)
(Common to CE & ME)

UNIT I: Review of Programming constructs
Programming Environment, Expressions formation, Expression evaluation, Input and Output patterns, Control Structures, Sequential branching, Unconditional branching, Loop Structures,Coding for Pattern Display.

UNIT II: Introduction to Linear Data, strings and pointers
Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding, Working on character data, Compiler defined methods, Substitution coding for defined methods, Row Major representation, Column Major representation, Basic searching and sorting Methods.

UNIT III :Functions, Recursions and Storage Classes
Functions – Introduction to modular programming – Function Communication - Pass by value,Pass by reference – Function pointers – Recursions – Type casting – Storage classes
Practice: programs on passing an array and catching by a pointer, function returning data, comparison between recursive and Iterative solutions.
Data referencing mechanisms: Pointing to diff. data types, Referencing to Linear data, Runtime-memory allocation, Named locations Vs pointed locations, Referencing a 2D-Matrix.

UNIT IV User-defined data types, Pre-processor Directives and standard storage
Need for user-defined data type – structure definition – Structure declaration – Array within a Structure – Array of Structures – Nested Structures - Unions – Declaration of Union data type, StructVs Union - Enum – Pre-processor directives , Standard storage methods, Operations onfile, File handling methods, Orientation to Object oriented programming
Practice: Structure padding, user-defined data storage and retrieval programs

UNIT V Operating system principles and Database concepts
Introduction to Operating system principles, Process scheduling algorithms, Deadlock detection and avoidance, Memory management, Networking: Introduction to Networking, OSI Model Vs. TCP/IP suite, Datalink layer, Internet layer, DVR Vs. LSR, Transport Layer, Application Layer

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 BS 3202	
Course Title: BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

COMPUTER SCIENCE AND ENGINEERING

Regulation: R17							I / IV - B.Tech I - Semester		
COMPTER SCIENCE ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**Lab**	**I_M**	**E_M**	**Total Marks**
B17 BS1101	English – I	BS	3	3	1	--	30	70	100
B17 BS1102	Mathematics – I	BS	3	3	1	--	30	70	100
B17 BS1103	Mathematics-II	BS	3	3	1	--	30	70	100
B17 BS1104	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS1101	Computer ProgrammingUsing C	ES	3	3	1	--	30	70	100
B17 CE1101	Environmental Studies	ES	2	2	1	--	30	70	100
B17 BS1106	Engineering Physics Lab	BS	2	--	--	3	50	50	100
B17 BS1108	English Communication Skills Lab – I	BS	2	--	--	3	50	50	100
# DL1	Department Lab	ES	2	--	--	3	50	50	100
B17 BS1110	Engineering Physics Virtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS1112	NCC	BS	--	--	--	2	--	--	--
Total			**23**	**17**	**6**	**13**	**330**	**570**	**900**

- C – Category
- Cr – Credits
- L – Lecture Hours
- T – Tutorial Hours
- I_M – Internal Marks
- E_M – Exam Marks

#DL 1	CSE & IT	B17 CS 1102	C Programming Lab & Hardware Fundamentals
	ECE	B17 CS 1103	C Programming Lab

SYLLABUS: ENGLISH – I (B17 BS 1101)
(Common to all Branches)

Life through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I

People and Places:-Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types- Describing people, places and events-Writing sentences-Self-awareness- Self-motivation, Dialogue writing.

UNIT-II

Personality and Lifestyle:- Word quiz – Verbs-Adverbs-Negotiations-Proving yourself- Meeting Carl Jung-Describing yourself- Living in the 21st century- Using your dictionary- Communication-Adaptability.

UNIT-III

Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report-Magazine article- User's Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue- Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

UNIT-IV

Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewing employees- Your first interview- Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V

Work and Business:- A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The InsideStory,* Mark Zuckerberg: World's Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business-Recession- Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS – I (B17 BS 1102)
(Common to all Branches)

UNIT I: Differential equations of first order and first degree:

Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Newton's Law of cooling, Law of natural growth and decay, orthogonaltrajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, xV(x), Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:

Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplacetransforms.

UNIT IV: Partial differentiation:

Introduction, Homogeneous functions, Euler's theorem, Total derivative, Chain rule, whichvariable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign.

Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange's method (with constraints)

UNIT V: First order and higher order partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions,

solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit's method).

Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type e^{ax+by}, sin (ax+by), cos (ax+by), $x^m y^n$.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also, will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also, will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

SYLLABUS: MATHEMATICS – II (B17 BS 1103)

(Common to CSE, ECE& IT)

UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backward differences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second order and fourth order).

UNIT IV: Fourier series:

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval's formula.

UNIT V: Fourier Transforms:

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval's identities, Finite Fourier transforms.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1103	
Course Title: MATHEMATICS –II	
CO-1	Find a real root of algebraic and transcendental equations using different methods.
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules
CO-4	Solve a first order ordinary differential equation by Euler and RK methods
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms, Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: ENGINEERING PHYSICS (B17 BS 1104)
(Common to CSE, ECE& IT)

UNIT I: Interference and Diffraction

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton's rings-Michelson's interferometer. Fraunhoffer's diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers

Introduction, Spontaneous emission and Stimulated emission – Einstein's relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle- Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

UNIT- III: Electro Magnetic Fields and Ultrasonics

Concept of Electromagnetic induction , Faraday's law, Lenz's law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere's law, Maxwell's equations and their significance (withoutderivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function- significance-Schrodinger"s time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands ofcrystalline solids-Distinction between Conductors, Semiconductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC, FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg"s law.

Introduction to Nanomaterials – Synthesis methods: Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

(Note: Assignment Marks of Engineering Physics are to be considered from the internal marks of Engineering Physics-- Virtual Labs – Assignments B17 BS 1110)

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1104	
Course Title: ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonics as a tool for technological applications
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C
(B17 CS 1101)
(Common to CSE, ECE & IT)

UNIT I:

Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts.

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high level languages, Creating and Running Programs: Writing, Editing (vi/emacs editor), Compiling (gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arithmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation

POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:

Objective: Understanding miscellaneous aspects of C

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration,definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, type def, bit-fields, program applications

BIT-WISE OPERATORS: logical, shift, rotation, masks.Objective: Comprehension of file operations

FILEHANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

Course Outcomes for First Year First Semester Course	
Course Code:B17 CS 1101	
Course Title: COMPUTER PROGRAMMINGUSING C	
CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program. Design programs involving decision structures, loops and functions.
CO-4	Explain the difference between call by value and call by reference
CO-5	Understand the dynamics of memory by the use of pointers
CO-6	Use different data structures and create/update basic data files.

ENVIRONMENTAL STUDIES (B17 CE 1101)
(Common to all Branches)

UNIT – I

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

Ecosystems:

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers andDecomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems DesertEcosystems and Aquatic Ecosystems

UNIT-II

Biodiversity:

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservationof Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

UNIT-III

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture. Forest Resources: Use and over exploitation-Mining and Dams-their effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. Energy Resources: Renewable and non-renewable energy sources, use of alternate energysources-impact of energy use on environment.

UNIT-IV

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India:

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management

UNIT-V

Institutions and Governance:

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants.

Course Outcomes for First Year First Semester Course	
Course Code:B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

SYLLABUS: ENGINEERING PHYSICS LAB (B17 BS 1106)
(Common to CSE, ECE& IT)

LIST OF EXPERIMENTS
(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gees apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Youngs modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck's constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1106	
Course Title: ENGINEERING PHYSICS LAB	
CO-1	Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements individually.
CO-2	Students get hands on experience in setting up experiments and using the instruments/equipment
CO-3	Get introduced to using new/ advanced technologies and understand their significance.

SYLLABUS: ENGLISH COMMUNICATIONSKILS LAB- I (B17 BS 1108)
(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologizing, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS (B17 CS 1102)

(Common to CSE & IT)

List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs

b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man

c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion

b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.

b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow – II

a. Write a C Program to Find Whether the Given Number is

i. Prime Number

ii. Armstrong Number

B Write a C program to print Floyd Triangle

c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values.

b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III

Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch case

Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (Use factorial function)

Exercise-8

Arrays Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure

b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.

i) copy

ii) concatenate

iii) length

iv) compare

b) Implementation of string manipulation operations **without** library function.

i) copy

ii) concatenate

iii) length

iv) compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Exercise - 15

a) System Assembling, Disassembling and identification of Parts/Peripherals.

b) Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.

Exercise - 16

a) MS-Office / Open Office

i. Word - Formatting, Page Borders, Reviewing, Equations, symbols

ii. Spread Sheet-Organize data, usage of formula, graphs, charts.

iii. Power point - features of power point, guidelines for preparing aneffective presentation.

b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewallsettings. Installing application software, system software & tools.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)

The Lab record must be a print of the LATEX (.tex) Format

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1102	
Course Title: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS (Common to CSE & IT)	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software

SYLLABUS: C PROGRAMMING LAB (B17CS1103)
(For ECE)
Programming

Exercise - 1 Basics

What is an OS Command, Familiarization of Editors - vi, Emacs

Using commands like mkdir, ls, cp, mv, cat, pwd, and man

C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

Write a C Program to Simulate 3 Laws at Motion

Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

Write a C Program to Find Whether the Given Year is a Leap Year or not.

Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

Write a C Program to Find Whether the Given Number is

Prime Number

Armstrong Number

Write a C program to print Floyd Triangle

Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

Write a C Program demonstrating of parameter passing in Functions and returningvalues.

Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

Write a C Program to make a simple Calculator to Add, Subtract, Multiply or DivideUsing switch…case

Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure
b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs.

Exercise – 12 Strings

Implementation of string manipulation operations **with** library function.

i) copy
ii) concatenate
iii) length
iv) compare

Implementation of string manipulation operations **without** library function.

v)copy
vi)concatenate

vii) length

viii) compare

Exercise -13 Files

Write a C programming code to open a file and to print it contents onscreen.

Write a C program to copy files

Exercise - 14 Files Continued

Write a C program merges two files and stores their contents in another file.

Write a C program to delete a file.

Note: All the Programs must be executed in the Linux Environment. (Mandatory)

The Lab record must be a print of the LATEX (.text) Format

SYLLABUS: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS (B17 BS 1110) (Common to CSE, ECE & IT)

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson's interferometer
13. Black body radiation

URL: www.vlab.co.in

(Note: Internal Marks of Engineering Physics - Virtual Labs – Assignments are to be considered as Assignment marks in the Internal Marks of Engineering Physics- B17 BS 1104)

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1110	
Course Title: ENGINEERING PHYSICS VIRTUAL LABS–ASSIGNMENTS (Common to CSE, ECE & IT)	
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

NCC (B17 BS 1112)
(Common to CSE, ECE & IT)

The NCC- National Integration and Awareness- Drill- Personality Development Life Skills- Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

(Note: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17						**I / IV - B.Tech. II- Semester**			
COMPUTER SCIENCE ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**Lab**	**I_M**	**E_M**	**Total Marks**
B17 BS1201	English – II*	BS	3	3	1	--	30	70	100
B17 BS1203	Mathematics – III*	BS	3	3	1	--	30	70	100
B17 BS1205	Engineering Chemistry	BS	3	3	1	--	30	70	100
B17 ME1201	Engineering Drawing	ES	3	1	--	3	30	70	100
# DS 2	Department Subject	ES	3	3	1	--	30	70	100
# DS 3	Department Subject	ES	3	3	1	--	30	70	100
B17 BS1207	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100
B17 BS1208	English Communication Skills Lab – II*	BS	2	--	--	3	50	50	100
# DL2	Department Lab	ES	2	--	--	3	50	50	100
B17 BS1212	Inner Engineering	BS	--	--	--	2	--	--	--
Total			**24**	**16**	**5**	**14**	**330**	**570**	**900**

- C – Category
- Cr – Credits
- L – Lecture Hours
- T – Tutorial Hours

I_M – Internal Marks

E_M – Exam Marks

DS 2	CSE & IT	B17 CS 1202	Object Oriented Programming Through C++
	ECE	B17 CS 1203	Data Structures
#DS 3	CSE & IT	B17 EC 1201	Elements of Electronics Engineering
	ECE	B17 EE 1203	Elements of Electrical Engineering
DL2	CSE & IT	B17 CS 1205	Object Oriented Programming Lab
	ECE	B17 BS 1209	Engineering Workshop & IT Workshop

SYLLABUS: ENGLISH – II (B17 BS 1201)
(Common to all Branches)

UNIT I:

A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'

B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

UNIT II:

A. Detailed-Text: Unit 2: ' A Dilemma'

B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

UNIT III:

A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments

B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

UNIT IV:

A. Detailed-Text: Unit 4: 'The Lottery'

B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

UNIT V:

A. Detailed-Text: Unit 5: ' The Chief Software Architect'

B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS: MATHEMATICS – III (B17 BS 1203)
(Common to all Branches)

UNIT I: Linear systems of equations:

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.

Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.

Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.

Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

UNIT IV: Vector Differentiation:

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related Problems

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix, Reduce a Quadratic form to its canonical form and classify
CO-3	Evaluate double integrals over a region and triple integral over a volume.

CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green's, Stokes and Gauss divergence theorems.

SYLLABUS: ENGINEERING CHEMISTRY (B17 BS 1205)

(Common to CSE, ECE & IT)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications ofPolyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.

Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination ofCalorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann‟s by-product coke oven process; Refining of Petroleum, Knocking- octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG, CNG. Lubricants: - Definition, Mechanism of Lubrication, Properties of Lubricants (Definition andsignificance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings

– Galvanizing, Tinning, Electroplating; Electrroless plating; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials

Cement: - Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refactories. Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi-Conductors, Classification and chemistry of semiconductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1205	
Course Title: ENGINEERING CHEMISTRY (Common to CSE, ECE & IT)	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: ENGINEERING DRAWING (B17 ME 1201)
(Common to CSE, ECE & IT)

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

UNIT III

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1201	
Course Title: ENGINEERING DRAWING(Common to CSE, ECE & IT)	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

OBJECT-ORIENTED PROGRAMMING THROUGH C++ (B17 CS 1202)

(Common to CSE & IT)

UNIT-I: Introduction to C++, Classes and Objects.

Difference between C and C++, Disadvantage of Conventional Programming, Basic Concepts of Object Oriented Programming, Advantage of OOP, Object Oriented Languages, Functions in C++, Operators in C++. Classes and Objects: Declaring Objects, Access Specifiers and their Scope, Static data members, static member functions, arrays of objects, local classes, Nested classes.

UNIT-II: Constructors, Destructors and Operator Overloading.

Constructors and Destructors: Introduction- Constructors and Destructor- types of constructors, Constructors with default Arguments, Dynamic initialization of objects, Dynamic constructors. Operator Overloading Introduction, Overloading Unary Operators and Binary Operators, Overloading Unary Operators and Binary Operators using friend function, Overloading Assignment Operator (=), Overloading insertion(<<) and extraction(>>) operators, Manipulation of Strings using Operators, Rules for Overloading Operators, Type Conversions.

UNIT-III: Inheritance, Pointers, Virtual Functions and Polymorphism.

Inheritance: Reusability, Types of Inheritance, Virtual Base Classes, Abstract Classes, Advantages of Inheritance, Disadvantages of Inheritance, and constructors in derived classes. Pointers Introduction: Pointers to Objects, "this" Pointer, Pointers to Derived Classes, including Polymorphisms and Virtual Functions, Rules for Virtual Functions, pure virtual functions.

UNIT-IV: Manipulating Strings, Managing console I/O operations and Exception Handling.

Strings: Creating String Objects, Manipulating String Objects, Relational operations, String Characteristics, Accessing Characters in Strings. C++ Stream Classes, Unformatted I/O operations, Formatted I/O operations, managing output with Manipulators, Exception Handling: Principles of Exception Handling, Exception Handling Mechanism, throwing and catching Mechanism.

UNIT-V: Generic Programming with Templates, Standard Template Library and Files. Generic Programming with Templates, Need for Templates, Definition of class Templates, Normal Function Templates, Over Loading of Template Function-Bubble Sort Using Function Templates, Difference between Templates and Macros, Overview of Standard Template Library, STL Programming Model, Containers, Algorithms, Iterators, Vectors, Lists, Maps. FILES: Introduction, File Stream Classes, File Operations, File Pointers and Manipulators, Sequential Access Files, Random File Access Operation, Detecting End-of File, Command-Line Arguments.

Course Outcomes for First Year First Semester Course	
Course Code:B17 CS 1202	
Course Title: OBJECT-ORIENTED PROGRAMMING THROUGH C++ (Common to CSE & IT)	
CO-1	Write, compile and debug programs in C++ language. Use different data types in a computer program.
CO-2	Design programs involving decision structures, loops and functions.
CO-3	Explain classes and abstract classes and objects, abstraction and encapsulation, inheritance, polymorphism, constructors, access control and overloading.
CO-4	Solve a given application problem by going through the basic steps of program specifications, analysis, design, implementation and testing within the context of the object-oriented paradigm.

SYLLABUS: DATA STRUCTURES (B17 CS 1203)
(For ECE)

UNIT-I

Arrays and Structures

Array as an Abstract Data Type, Polynomial Abstract Data Type, Introduction to Sparse Matrix, Sparse Matrix Abstract Data Type, Representation of Multidimensional Arrays, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures.

Recursion, Simple Searching and Sorting Techniques

Recursive functions, Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Introduction to Merge Sort, Iterative Merge Sort, Recursive Merge Sort, Heap sort.

UNIT-II

Stacks and Queues

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, , Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Multiple Stacks and Queues, Circular Queues using arrays.

UNIT-III

Linked Lists

Pointers, Dynamically Allocated Storage using pointers, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Additional List Operations, Operations for Singly Linked Lists, Operations for Doubly Linked Lists, RadixSort.

UNIT-IV

Trees

Representation of Trees, Binary Trees Abstract Data Type,Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Priority Queues, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree, Counting Binary Trees.

UNIT-V

Graphs

Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim's and Kruskal's Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination – Dijkstra's Algorithm, All Pairs Shortest Paths - Floyd's Algorithm, Transitive Closure using warshall's Algorithm.

ELEMENTS OF ELECTRONICS ENGINEERING (B17 EC 1201)

(Common to CSE & IT)

UNIT I: Semiconductors and P-N junction diode:

Intrinsic and extrinsic semiconductors, charge densities in semiconductors, Drift and Diffusion currents, Hall Effect, Mass action law.Basic operation and V-I Characteristics of semiconductor diode, Diode current equation, Avalanche breakdown and Zener breakdown phenomenon.

UNIT II: Special Diodes and Diode Rectifiers:

Zener Diode, LED, Photo Diode and tunnel diode, Half wave and Full wave Rectifiers- with and without filters, Bridge Rectifier,Expressions - Ripple factor,Efficiency, Capacitor filters

.

UNIT III: Bipolar Junction Transistor:

Introduction, construction, basic operation of npn and pnp transistors, Transistor circuit configurations- CE,CB, CC- Input and output Characteristics in various configurations.h- parameter model for transistor amplifier.*(Introductory Treatment only).*

UNIT IV: Transistor Biasing and Thermal Stabilization:

Transistor Biasing, Thermal runaway, stabilization, Different methods of Biasing-Fixed Bias, collector feedback bias, self-bias, Bias compensation.

UNIT V: Field Effect Transistors: Junction field Effect Transistors (JFET)- JFET characteristics, JFET Parameters, Small Signal model of FET, Depletion and Enhancement type MOSFET‟s.

Course Outcomes for First Year First Semester Course	
Course Code:B17 EC 1201	
Course Title: ELEMENTS OFELECTRONICS ENGINEERING (Common to CSE & IT)	
CO-1	Understand the basic concepts of transport of charge carriers in semiconductors, drift and diffusion currents, physical structure, operation, V-I characteristics of semiconductor diode. .
CO-2	Understand the basic concepts of special types of diodes like Zener Diode, LED, Photo Diode and tunnel diode, rectifier circuits with and without filters.
CO-3	Understand the physical structure, operation, input and output characteristics of BJT in CE, CB, CC circuit configurations.
CO-4	Understand the basic concepts of transistor biasing and thermal stabilization.
CO-5	Understand the physical structure, operation, characteristics and circuit models of JFET‟s and MOSFET’s.

SYLLABUS: ELEMENTS OF ELECTRICAL ENGINEERING (B17 EE 1203)
(For ECE)

UNIT I: Electrical and Magnetic Circuits:

Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, Series and parallelCircuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday's laws, Lenz's law, statically induced EMF, dynamically induced EMF.

UNIT – II: DC Machines:

Principle of operation of DC Generator - EMF equation – Construction-Types of DC generator- OCC of DC Generator-DC motor types - Torque equation –Losses-Efficiency-speed control methods- applications

UNIT – III: Transformers:

Principle of operation of single phase transformer - EMF equation - equivalent circuit –losses - efficiency and regulation- Open circuit and Short circuit tests.

UNIT – IV: Induction Motors:

Construction-Principle of operation of induction motor-slip- rotor frequency, slip - torque characteristics - Power flow diagram-Efficiency-Applications

UNIT – V: Synchronous Generator and Measuring Instruments:

Construction-Principle of operation of alternator-EMF equation of alternator- Regulation by Synchronous impedance method.

Classification –Deflecting, controlling, damping Torque, ammeter, voltmeter, wattmeter, MI, MC instruments-Energy meter

SYLLABUS: ENGINEERING CHEMISTRY LAB (B17 BS 1207)

(Common to CSE, ECE& IT)

List of Experiments

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by $KMnO_4$.
4. Estimation of oxalic acid by $KMnO_4$
5. Estimation of Mohr‟s salt by $K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler‟s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1207	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment’s
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- II (B17 BS 1208)
(Common to All Branches)

- Debating & Practice.
- Group Discussions & Practice.
- Presentation Skills & Practice
- Interview Skills & Practice
- Email
- Curriculum Vitae & Practice
- Idiomatic Expressions
- Common Errors in English & Practice

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: OBJECT ORIENTED PROGRAMMING LAB (B17 CS 1205)

(Common to CSE & IT)

LIST OF PROGRAMS

1. Write a Programme that computes the simple interest and compound interest payable on principal amount (in Rs.) of loan borrowed by the customer from a bank for a giver period of time (in years) at specific rate of interest. Further determine whether the b bank will benefit by charging simple interest or compound interest

2. Write a Programme to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to thepassenger according to following criteria.

3. Write a C++ Program to illustrate Enumeration and Function Overloading

4. Write a C++ Program to illustrate Scope and Storage class

5. Implementation of ADT such as Stack and Queues

6. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading

7. Write a Program to illustrate Static member and methods

8. Write a Program to illustrate Bit fields

9. Write a Program to overload as binary operator, friend and member function

10. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function

11. Write a C++ Program to illustrate Iterators and Containers

12. Write a C++ Program to illustrate function templates

13. Write a C++ Program to illustrate template class

14. Write C++ Programs and incorporating various forms of Inheritance

15. Write a C++ Program to illustrate Virtual functions

16. To write a C++ program to find the sum for the given variables using function with defaultarguments.

17. To write a C++ program to find the value of a number raised to its power that demonstrates afunction using call by value.

18. To write a C++ program and to implement the concept of Call by Address

19. To write a program in C++ to prepare a student Record using class and object

20. Implement the concept of unary operator overloading by creating a C++ program.

21. Write a C++ program for swapping two values using function templates

22. Write a C++ program to implement a file handling concept using sequential access.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1205	
Course Title: OBJECT ORIENTED PROGRAMMING LAB	
CO-1	Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
CO-2	Apply an object-oriented approach to developing applications of varying complexities.

ENGINEERING WORKSHOP & IT WORKSHOP (B17 BS 1209)
(For ECE)

PART-A ENGINEERING WORKSHOPSYLLABUS

Carpentry	Fitting
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

Note: At least two exercises to be done from each trade.

PART B: IT WORKSHOP:

LIST OF EXCERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. MS-Office / Open Office
   a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
   b) Spread Sheet - organize data, usage of formula, graphs, charts.
   c) Power point - features of power point, guidelines for preparing an effective presentation.
   d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

SYLLABUS: INNER ENGINEERING (B17 BS 1212)
(Common to CSE, ECE & IT)

Unit-I

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in the present Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

Unit-II

YES!+ Workshop:

Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management –Happiness point – Opposite Values – Pranayama – Sudarshan kriya

Unit-III

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life – Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

Unit-IV

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

Unit -V

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – PublicSpeaking – Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1212	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.

CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

(Note: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17										**II / IV - B.Tech. I- Semester**
COMPUTER SCIENCE ENGINEERING (under Choice Based Credit System / Elective Course System)										
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)										
Subject Code	**Course**	**C**	**Cr**	**L**	**T**	**Lab**	**Int.M**	**Ex.M**	**Total Marks**	
B17 CS2101	Data Structures	ES	3	3	1	--	30	70	100	
B17 BS2102	Probability, Statisticsand Queuing Theory	BS	3	3	1	--	30	70	100	
B17 BS2103	Discrete Mathematical Structures	BS	3	3	1	--	30	70	100	
B17 CS2102	Computer Graphics	ES	3	3	1	--	30	70	100	
B17 CS2103	Digital Logic Design	ES	3	3	1	--	30	70	100	
B17 CS2104	Data Analysis and Visualization usingPython	ES	3	3	1	--	30	70	100	
B17 CS2105	Data Structures Lab.	ES	2	--	--	3	50	50	100	
B17 CS2106	Data Analysis and Visualization usingPython Lab	ES	2	--	--	3	50	50	100	
B17CS2107	Industry orientedTraining : R Programming Lab	ES	1	--	--	2	50	---	50	
B17 BS2107	English Proficiency-I	BS	--	1	1	--	--	--	--	
Total			**23**	**19**	**7**	**8**	**330**	**520**	**850**	

- C – Category
  Cr – Credits
  L – lecture Hours
  T – Tutorial Hours

SYLLABUS: DATA STRUCTURES (B17 CS 2101)

UNIT -I Basic Concepts, Arrays, Structures and Recursion:

System Life Cycle, Algorithm Specification, Data Abstraction, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notation, Comparing Time Complexities. Array as an Abstract Data Type, Polynomial Abstract Data Type, Representation of Multidimensional Arrays, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures, Recursive functions.

UNIT –II Simple Searching and Sorting Techniques:

Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Introduction to Merge Sort, Iterative Merge Sort, Recursive Merge Sort, Shell Sort, Radix Sort.

UNIT -III Stacks, Queues and Linked Lists:

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Circular Queues using arrays. Pointers, Dynamically Allocated Storage using pointers, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials.

UNIT -IV Trees: Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree, Counting Binary Trees.

UNIT -V Graphs: Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim‟s and Kruskal‟s Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination - Dijkstra‟s Algorithm, All Pairs Shortest Paths - Floyd‟s Algorithm, Transitive Closure using Warshall‟s Algorithm.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS 2101	
Course Title: DATA STRUCTURES	
CO-1	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
CO-2	Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs. Demonstrate different methods for traversing trees [ABET (a)].
CO-3	Compare alternative implementations of data structures with respect to performance [ABET (a, b, c)].
CO-4	Compare and contrast the benefits of dynamic and static data structures implementations [ABET (a, b, c)].
CO-5	Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack [ABET (a, c)].
CO-6	Discuss the computational efficiency of the principal algorithms for sorting, searching.

SYLLABUS: PROBABILITY, STATISITICS & QUEUING THEORY (B17 BS 2102)

UNIT -I

Random Variables and Probability functions: Review on basic concepts of Probability (no questions will be set on review),Definition of a random variable, Distribution function, Properties of Distribution Function, Discrete Random Variable, Probability Mass Function, Discrete Distribution Function, Continuous Random Variable, Probability Density Function, Continuous Distribution Function.

Mathematical Expectation: Mathematical Expectation of a Random Variable, Expected Value of function of a Random Variable, Addition Theorem and Multiplication Theorem of Expectation(without proofs), Statistical Measures like Mean, Variance, Moments and Covariance in terms of Expectations.

Generating functions: Moment generating Function, Characteristic Function and Probability generating Function of a Random Variable.

UNIT II

Discrete Distributions: Binomial distribution and Poisson distribution - Definition, Mean, Variance, moments, m.g.f., Characteristic function, p.g.f., fitting of distributions.

Continuous Distributions: Normal Distribution - Definition, Standard Normal Variate, Mean, Variance, m.g.f., Characteristic function Applications of Normal Distribution, Importance of Normal distribution. Exponential Distribution, Definition, Mean, Variance and Memory less property of Exponential distribution.

UNIT III

Curve fitting: Method of least Squares, fitting of a Straight line, Fitting of a Parabola. Correlation: Definition, Karl Pearson‟s Coefficient of Correlation, Limits for correlation coefficient, Rank Correlation, Spearman‟s formula for rank correlation coefficient.

Regression Analysis: Regression Lines, Regression Coefficients and their properties (withoutproofs)

UNIT IV

Sampling Theory: Sample, population, statistic, parameter, Sampling distribution, standard error, point and interval estimation. Testing of Hypothesis: Formulation of Null hypothesis, Alternative hypothesis, Critical region, level of significance, Errors in sampling- Type-I-error, Type-II-error, One-tailed and Two-tailed tests.

Large Sample Theory: Test of significance of single sample proportion, Test of significance fordifference of proportions.

Small Sample Theory: Degrees of freedom, Student‟s-t-distribution: definition, t-test for single mean, t-test for difference of means, Paired t-test for difference of means.

F-distribution: definition, F-test for equality of two population variances. Chi-square distribution: definition, Chi-square test for goodness of fit, Chi-square test for Population Variance.

UNIT V

Queuing Theory: Queue description, Birth and Death Process, Distribution of Inter-arrival times, Distribution of service times, Kendall‟s representation of a queueing model, operating

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS2102	
Course Title: PROBABILITY, STATISITICS& QUEUING THEORY	
CO-1	Identify the random variable as discrete/continuous and analyse it.
CO-2	Predict the distribution suitable for the given data from its moments.
CO-3	Measure the intensity of association between the variables.
CO-4	Fit a best suitable Curve for the given data.
CO-5	Decide the test applicable for giving inference about Population Parameter based on Sample statistic.
CO-6	Make business decisions about the resources needed to provide a service in day-to-day life applications including telecommunication, traffic engineering, computing and the design of factories, shops, offices and hospitals.

SYLLABUS: DISCRETE MATHEMATICAL STRUCTURES (B17 BS2103)

UNIT -I: Mathematical Logic:

Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory forPredicate Calculus.

UNIT -II:

Relations*:* Definition of Relation, Properties of Binary Relations, Relation Matrix and Digraph, Operations on

Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams.

Algebraic Structures: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism.

UNIT -III Combinatorics:

Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.

UNIT -IV: Recurrence Relations:

Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

UNIT -V: Graph Theory:

Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite graphs, Planar Graphs, Euler‟s Formula.

Number Theory: Properties of Integers, Division theorem, Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat‟s Theorem and Euler‟s Theorem).

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2103	
Course Title: DISCRETE MATHEMATICAL STRUCTURES	
CO-1	Rewrite the mathematical arguments using logical connectives and quantifiers and verify the validity of the arguments using propositional and predicate logic.
CO-2	Identify and give examples of various types of relations and describe various properties of relations.
CO-3	Solve different counting problems.
CO-4	Solve the recurrence relations which occur in many fields.
CO-5	Utilize the concepts in graphs and Number theory in their fields.

SYLLABUS: COMPUTER GRAPHICS (B17CS2102)

UNIT-I Overview of Graphics Systems:

Applications of Computer Graphics-Graphical User Interfaces-Video Display Devices-Raster Scan Systems-Random Scan Systems-Graphics Monitors and Workstations -Input Devices- Logical Classification of Input Devices-Hard Copy Devices- Graphics Software-Overview of C- Graphics, Open GL and PHIGS.

UNIT-II Output Primitives and it attributes:

Points and Lines-Line Drawing Algorithms- Circle Generating Algorithms- Parallel Line Algorithms-Functions in C-Graphics for Output Primitives-Color and Gray Scale Levels - Boundary Fill Algorithm- Flood Fill Algorithm -Anti-aliasing Techniques.

UNIT-III Two-Dimensional Geometric Transformations:

Basic Transformations- Matrix Representations- Homogeneous Coordinates- Composite Transformations-Reflection- Shear- Transformations between Coordinate Systems- Affine Transformations- Raster Methods for Transformations.

UNIT-IV Two-Dimensional Viewing:

The Viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping- Text and Exterior Clipping

UNIT-V Three-Dimensional Geometric Transformations and Viewing:

Translation- Rotation- Scaling- Reflection -Shear-Composite Transformations-Modeling and Coordinate Transformations-3D Display Methods- Spline Representations-Natural Cubic Spline
- Bézier Curves and Surfaces-3D Viewing Pipeline- Viewing Coordinates- Projections- View Volumes-General Projection Transformations.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS2102	
Course Title: COMPUTER GRAPHICS	
CO-1	Summarize the application areas of computer graphics.
CO-2	Implement algorithms for scan converting graphic primitives in a graphic package.
CO-3	Apply direct and indirect methods for two-dimensional transformations using matrices.
CO-4	Construct three-dimensional geometric transformations using matrices.
CO-5	Visualize two-dimensional viewing transformations.
CO-6	Produce views of three-dimensional scenes.
CO-7	Visualize the working of I/O devices.

SYLLABUS: DIGITAL LOGIC DESIGN (B17 CS 2103)

UNIT- I Binary Systems, Boolean algebra and Logic Gates:

Digital Systems -- Binary Numbers -- Number Base Conversions -- Octal and Hexadecimal Numbers -- Complements -- Signed Binary Numbers -- Binary Codes -- Binary Storage and Registers -- Binary Logic -- Basic Definitions -- Axiomatic Definition of Boolean Algebra -- Basic Theorems and Properties of Boolean Algebra -- Boolean Functions -- Canonical and Standard Forms -- Other Logic Operations -- Digital Logic Gates -- Integrated Circuits.

UNIT- II Gate-Level Minimization, Combinational Logic Design:

The Map Method -- Four-Variable Map -- Five-Variable Map -- Product of Sums Simplification -Don't-Care Conditions - NAND and NOR Implementation -- Other Two- Level Implementations -- Exclusive-OR Function -- Hardware Description Language(HDL) -- Combinational Circuits -- Analysis Procedure -- Design Procedure -- Binary Adder- Subtractor -- Decimal Adder -- Binary Multiplier -- Magnitude Comparator – Decoders – Encoders – Multiplexers -- HDL For Combinational Circuits.

UNIT- III Sequential Logic Design, Synchronous Sequential Logic:

Sequential Circuits – Latches -- Flip-Flops -- Analysis of Clocked Sequential Circuits -- StateReduction and Assignment -- Design Procedure -- HDL for Sequential Circuits.

UNIT- IV: Registers ad Counters, Fundamentals of Asynchronous Sequential Logic: Registers -- Shift Registers -- Ripple Counters -- Synchronous Counters -- Other Counters --HDL for Registers and Counters -- Introduction to Asynchronous Sequential Logic -- AnalysisProcedure -- Circuits With Latches -- Design Procedure. Hazards

UNIT-V Memory and Programmable Logic:

Introduction -- Random-Access Memory -- Memory Decoding -Error Detection and Correction -- Read-Only Memory --Programmable Logic Array -- Programmable Array Logic -- SequentialProgrammable Devices.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS2103	
Course Title: DIGITAL LOGIC DESIGN	
CO-1	An Ability to define different number systems, binary addition and subtraction, 2`s complement representation and operations with his representation.
CO-2	An Ability to understand different Boolean Algebra theorems and apply them for logic functions.
CO-3	An Ability to design the Karnaugh map for a few variables and perform an algorithmic

	reduction of logic functions.
CO-4	An Ability to define the following combinational circuits: multiplexer, de-multiplexers, encoders/decoders, comparators, arithmetic-logic units and to be able to build simple circuits.
CO-5	An ability to understand asynchronous and synchronous sequential circuits like counters and registers.
CO-6	An ability to understand memories like RAM and ROM, Programmable Logic Devices

SYLLABUS: DATA ANALYSIS AND VISUALIZATION USING PYTHON (B17 CS 2104)

UNIT-I

Introduction to Python: About Python, History, Features of Python, Who uses Python, What can we do with Python, Variables, Data Types, Operations, Operators.

Python OOP: Python Classes, Methods, constructors, Inheritance, Data Hiding, Exceptions, Modules, Packages, Files

UNIT-II

NumPy Arrays and Vectorized Computation: NumPy arrays, Array creation, Indexing and slicing, Fancy indexing, Numerical operations on arrays, Array functions, Data processing using arrays, Loading and saving data, Saving an array, Loading an array, Lists, Tuples, Dictionary, Sets, Control Loops, Linear algebra with NumPy, NumPy random numbers

UNIT-III

Data Analysis with Pandas: An overview of the Pandas package, The Pandas data structure-Series, The DataFrame.

The essential basic functionality: Reindexing and altering labels, Head and tail, Binaryoperations, Functional statistics, Function application, sorting,

Indexing and selecting data, Computational tools, working with missing data, advanceduses of Pandas for data analysis - Hierarchical indexing, The Panel data

UNIT-IV

Statistics for Data Analysis :: Fitting aggregated counts to the Poisson distribution, Determining confidence intervals for mean, variance, and standard deviation, Correlating variables with Pearson's correlation, Correlating variables with the Spearman rank correlation, Evaluating relations between variables with ANOVA, Learning About Models- Models and experiments, The cumulative distribution function, Working with distributions, The probability density function, Multivariate distributions, Regression-Introducing linear regression-Getting the dataset, Testing with linear regression, Multivariate regression-Adding economic indicators, Logistic regression

UNIT-V

Data Visualization: The matplotlib API primer-Line properties, Figures and subplots, Exploringplot types-Scatter plots, Bar plots, Histogram plots, Legends and annotations, Plotting functions with Pandas, Additional Python data visualization tools-Bokeh, MayaVi

Interacting with Databases and Data Analysis Application:: Interacting with data in text format: Reading data from text format, Writing data to text format, Interacting with data in binary format:HDF5, Interacting with data in MongoDB, Interacting with data in Redis:The simple value, List, Set, Ordered set, Data munging: Cleaning data, Filtering , Merging data, Reshaping data, Data aggregation , Grouping data.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS 2104	
Course Title: DATA ANALYSISANDVISUALIZATION USINGPYTHON	
CO-1	Acquire knowledge on Basics of Python.
CO-2	Acquire knowledge on OOP of Python.
CO-3	Acquire knowledge on NumPy and Basics of Statistics.
CO-4	Use library such as Pandas.
CO-5	Acquire knowledge on Graph Visualizations in Python.
CO-6	Acquire knowledge on Data analysis.

SYLLABUS: DATA STRUCTURES LAB (B17 CS 2105)

Implement the following programs using C-Language.

1. Write a program for sorting a list using Bubble sort and then apply binary search.
2. Write a program to implement the operations on stacks.
3. Write a program to implement the operations on circular queues.
4. Write a program for evaluating a given postfix expression using stack.
5. Write a program for converting a given infix expression to postfix form using stack.
6. Write a program for implementing the mazing problem.
7. Write a program for the representation of polynomials using linked list and for the additionof two such polynomials.
8. Write a program for quick sort.
9. Write a program for Merge sort.
10. Write a program for Heap sort.
11. Write a program to create a binary search tree and for implementing the in order, preorder,post order traversal using recursion.
12. Write a program for finding the transitive closure of a digraph.
13. Write a program for finding the shortest path from a given source to any vertex in a digraphusing Dijkstras algorithm.
14. a) Write a program for finding the Depth First Search of a graph

    b) Write a program for finding the Breadth First Search of a graph

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS 2105	
Course Title: DATA STRUCTURES LAB	
CO-1	Student will be able to write programs to implement stacks and queues.
CO-2	Ability to implement various searching and sorting techniques.
CO-3	Ability to implement programs using trees and graphs.

SYLLABUS: DATA ANALYSIS AND VISUALIZATION USING R AND PYTHON LAB

(B17 CS 2106)

1. Python Programs on lists & Dictionaries
2. Python Programs on Searching and sorting
3. Python Programs on Text Handling
4. Python Programs on Files Handling
5. Python Programs for Mean, Mode, Median, Variance, Standard Deviation
6. Python Programs for Karl Pearson Coefficient of Correlation, Rank Correlation, Regression, Distribution,
7. Python Programs for **NumPy Arrays,** Linear algebra with NumPy
8. Python Programs for Data Frame using Pandas Library
9. Write a Python program for the following
   - Importing matplotlib,
   - Simple Line Plots,
   - Adjusting the Plot: Line Colors and Styles, Axes Limits,
   - Labeling Plots,
   - Simple Scatter Plots,
   - Histograms,
   - Customizing Plot Legends,
   - Choosing Elements for the Legend,
   - Multiple Legends,
   - Customizing Colorbars,
   - Multiple Subplots,
   - Text and Annotation,
     - Customizing Tick.
10. Python Programs for Interacting with data in text format, Interacting with data in binary format, Interacting with data in MongoDB, Interacting with data in Redis, Cleaning, Filtering and Merging Data

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS 2106	
Course Title: DATA ANALYSIS ANDVISUALIZATION USINGR AND PYTHON LAB	
CO-1	Acquire Programming knowledge on Basics of Python.
CO-2	Acquire Programming knowledge on Searching and sorting using Python.
CO-3	Acquire Programming knowledge on Text and File Handling.
CO-4	Develop Python Programs to Mean, Median, Mode, Correlation, Regression and Probability distributions.
CO-5	Acquire Programming knowledge on NumsPy, Pandas Library.
CO-6	Acquire Programming knowledge on Graph Visualizations in Python and Data for Analysis.

SYLLABUS: INDUSTRY ORIENTED TRAINING (B17 CS 2107)
(R Programming Lab)

- INSTALLING R
- Downloading and Installing R from CRAN
- Installing R on Your Windows Computer
- Running the R Program
- The Help Command in R
- Help for Windows Users
- Command Packages
- Standard Command Packages
- How to Get Extra Packages of R Commands
- How to Install Extra Packages for Windows Users
- Running and Manipulating Packages
- Loading Packages
- Windows-Specific Package Commands
- Removing or Unloading Packages
- Reading and Getting Data into R
- Using the combine Command for Making Data
- Entering Numerical Items as Data
- Entering Text Items as Data
- Using the scan Command for Making Data
- Entering Text as Data
- Using the Clipboard to Make Data
- Reading a File of Data from a Disk
- Reading Bigger Data Files
- The read. csv() Command
- Alternative Commands for Reading Data in R
- Missing Values in Data Files
- Viewing Named Objects
- Viewing Previously Loaded Named
- Objects
- Viewing All Objects
- Viewing Only Matching Names
- Removing Objects from R
- Types of Data Items

- Number Data
- Text Items
- Converting Between Number and Text Data
- The Structure of Data Items
- Vector Items
- Data Frames

Matrix Objects

- List Objects
- Saving Your Work in R
- Saving the Workspace on Exit
- Saving Data Files to Disk
- Save Named Objects
- Save Everything
- Reading Data Files from Disk
- Saving Data to Disk as Text Files
- Writing Vector Objects to Disk
- Writing Matrix and Data Frame Objects to Disk
- Writing List Objects to Disk
- Converting List Objects to Data Frames
- Manipulating Objects

Manipulating Vectors

- Selecting and Displaying Parts of a Vector
- Sorting and Rearranging a Vector
- Returning Logical Values from a Vector

Manipulating Matrix and Data Frames

- Selecting and Displaying Parts of a Matrix or Data Frame
- Sorting and Rearranging a Matrix or Data Frame

Manipulating Lists

- Viewing Objects within Objects
- Looking Inside Complicated Data Objects
- Opening Complicated Data Objects
- Quick Looks at Complicated Data Objects

Viewing and Setting Names

- Rotating Data Tables
- Constructing Data Objects
- Making Lists
- Making Data Frames

- Making Matrix Objects

Re-ordering Data Frames and Matrix Objects

Forms of Data Objects: Testing and Converting

Testing to See What Type of Object You Have

Converting from One Object Form to Another

- Convert a Matrix to a Data Frame
- Convert a Data Frame into a Matrix
- Convert a Data Frame into a List
- Convert a Matrix into a List
- Convert a List to Something Else

Box-whisker Plots

- Basic Boxplots
- Customizing Boxplots
- Horizontal Boxplots
- Scatter Plots
- Basic Scatter Plots
- Adding Axis Labels
- Plotting Symbols

- Setting Axis Limits
- Using Formula Syntax
- Adding Lines of Best
- Fit to Scatter Plots
- Pairs Plots (Multiple Correlation Plots)
- Line Charts
- Line Charts Using Numeric Data
- Line Charts Using Categorical Data
- Pie Charts
- Bar Charts
- Single
- -Category Bar Charts
- Multiple Category Bar Charts
- Stacked Bar Charts
- Grouped Bar Charts
- Horizontal Bars
- Bar Charts from Summary Data
- Creating Data for Complex Analysis

- Data Frames
- Matrix Objects
- Creating and Setting Factor Data
- Making Replicate Treatment Factors
- Adding Rows or Columns
- Summarizing Data
- Simple Column and Row Summaries
- Complex Summary Functions
- The rowsum () Command

- The apply () Command
- Using tapply () to Summarize Using a Grouping Variable
- The aggregate () Command

- Adding Elements to Existing Plots
- Adding Legends to Graphs
- Color Palettes
- Placing a Legend on an Existing Plot
- Adding Text to Graphs
- Making Superscript and Subscript Axis Titles
- Orienting the Axis Labels
- Making Extra Space in the Margin for Labels
- Setting Text and Label Sizes
- Adding Text to the Plot Area
- Adding Text in the Plot Margins
- Creating Mathematical Expressions
- Adding Points to an Existing Graph
- Adding Various Sorts of Lines to Graphs
- Adding Straight Lines as Gridlines or Best-Fit Lines
- Making Curved Lines to Add to Graphs
- Plotting Mathematical Expressions
- Adding Short Segments of Lines to an Existing Plot
- Adding Arrows to an Existing Graph
- Matrix Plots (Multiple Series on One Graph)
- Multiple Plots in One Window
- Splitting the Plot Window into Equal Sections

- Splitting the Plot Window into Unequal Sections
- Exporting Graphs
- Using Copy and Paste to Move a Graph
- Saving a Graph to a File

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CS 2107	
Course Title: INDUSTRY ORIENTED TRAINING(R Programming Lab)	
CO-1	Install and find documentation for R functions and libraries. Search for and find domain [1] specific R packages.
CO-2	Use and understand the R data types (vectors, matrices, data frames, strings)
CO-3	Reshape data and use visual exploratory graphics. Practice good data management.
CO-4	Write their own functions in R and break a problem into a set of functions.
CO-5	Be fluent in programming concepts such aqs functional programming, code reuse, object [1] oriented programming, recursion, regular expressions, and split-transform-recombine data manipulation.
CO-6	Engage in good code and data organization practices and use a consistent programming style

SYLLABUS: ENGLISH PROFICIENCY-I (B17 BS 2107)

UNIT-1: LISTENING

Selected

Motivational

SpeechesSelected

Moral Stories

UNIT-2: SPEAKING

Book Review

Skit Presentation

PowerPoint Presentations

Describing event/place/thing

Extempore

Group Discussion

Picture Perception and Describing Test

UNIT-3: READING

Speeded Reading

Reading Comprehension

UNIT-4: WRITING

Paragraph Writing

Literary Appreciation – Understanding the Language of Literature

UNIT-5: PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2107	
Course Title: ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

Regulation: R17							**II / IV - B.Tech. II- Semester**		
COMPUTER SCIENCE ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**Lab**	**Internal Marks**	**External Marks**	**Total Marks**
B17 CS2201	Computer Organization	ES	3	3	1	--	30	70	100
B17 CS2202	Operating Systems	ES	3	3	1	--	30	70	100
B17 CS2203	Microprocessors	ES	3	3	1	--	30	70	100
B17 CS2204	Data Communications	ES	3	3	1	--	30	70	100
B17 CS2205	Advanced Data Structures	ES	3	3	1	--	30	70	100
B17 ME2207	Operations Research	ES	3	3	1	--	30	70	100
B17 CS2206	Operating Systems & Unix programming Lab	ES	2	--	--	3	50	50	100
B17 CS2207	Digital Electronics &Microprocessors Lab	ES	2	--	--	3	50	50	100
B17 CS2208	Competitive Programming Lab	ES	1	--	--	2	50	--	50
B17 BS2204	Professional Ethics &Human Values	BS	--	2	--	--	--	--	--
B17 BS2206	English Proficiency-II	BS	--	1	1	--	--	--	--
Total			**23**	**21**	**7**	**8**	**330**	**520**	**850**

C – Category

Cr – Credits

L _ Lecture Hours

T _ Tutorial Hours

SYLLABUS: COMPUTER ORGANIZATION (B17 CS 2201)

UNIT-I

Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

UNIT-II

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer.

Micro programmed Control: Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC)

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISK Pipeline, Vector Processing, Array Processors.

UNIT-IV

Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), SerialCommunication.

UNIT-V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2201	
Course Title: COMPUTER ORGANIZATION	
CO-1	Knowledge about major components of a computer such as processor, memory and I/O modules along with their interconnections internally with outside world.
CO-2	Detailed idea about architecture of central processing unit, functions of control unit, memory, I/O devices and their issues.
CO-3	Simple and multiple processor organization and their issues.

SYLLABUS: OPERATING SYSTEMS (B17 CS 2202)

UNIT-I

Introduction to Operating Systems

Over View of Operating Systems, Types of Operating Systems, Operating System Structures, Operating System Services, System Calls, Virtual Machines, Operating System Design and Implementation.

UNIT-II

Process Management and Process Synchronization

Process Concepts, Operations on Processes, Co-operating Processes, Threads, Inter Process Communication, Process Scheduling, Scheduling Algorithms, Multiple - Processor Scheduling, Thread Scheduling. The Critical Section Problem, Petersons Solution, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT-III

Deadlocks

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Deadlock Detection, Recovery from Deadlocks

UNIT-IV

Memory Management

Logical versus Physical Address, Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, Virtual Memory, Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped files

UNIT-V

File Systems, Implementation, and Secondary-storage Structure and Case study

Concept of a file, Access Methods, Directory Structure, Protection, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers, overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, Case Study of UNIX, MS-DOS and Windows

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2202	
Course Title: OPERATING SYSTEMS	
CO-1	The student understands OS evolution, its structure and services provided by it.
CO-2	Learn process life cycle, process scheduling objectives, policies and mechanisms, process synchronization; inter process communication, deadlocks and other process subsystem related concepts.
CO-3	Learn memory hierarchy, allocation, de-allocation policies and mechanism for main and

	auxiliary memory; file system design and implementation issues.
CO-4	Investigate UNIX/ LINUX and Windows OS platforms w.r.t similarities and differences in design paradigms.

SYLLABUS: MICROPROCESSORS (B17 CS 2203)

UNIT-I

Internal Architecture, functional/signal description of 8085 microprocessor, Instruction set, Addressing modes and programming in 8085.

UNIT-II

Timing diagram, Counters and Time delays, Stacks and Subroutines and Interrupts in 8085

UNIT-III

Classification and interfacing semiconductor memories with 8085 MPU, Interfacing peripherals to INTEL 8085 using Parallel IO interface-8255, Keyboard/DisplatyInterface-8279

UNIT-IV

The 8086 Microprocessor architecture & functional /signal description, segmented memory, Maximum & Minimum modes of 8086.

UNIT-V

Addressing modes, Instruction set and assembly language programming techniques with 8086.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2203	
Course Title: MICROPROCESSORS	
CO-1	Students can able to understand The 8085A µP. Architecture [K1]
CO-2	Students can learn about 8085 Instruction Set [K2]
CO-3	The Student Develops The Skill Of Writing 8085 Microprocessor Programming [K3]
CO-4	Ability to design semiconductor memories [K2]
CO-5	Students can learn Parallel I/O Interface - 8255 [K2]
CO-6	Students can learn Keyboard/Display Interface - 8279 [K2]
CO-7	Students can able to understand The 8086 µP. Architecture [K1]
CO-8	Students can learn about 8086 Instruction Set [K1]
CO-9	The Student Develops The Skill Of Writing 80865 Microprocessor Programming [K3]

SYLLABUS: DATA COMMUNICATIONS (B17 CS 2204)

UNIT-I

Introduction to Data Communications:

A Communications Model, Data Communications and Data Communications Networking, Protocols and Protocol Architecture, Characteristics of Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments.

UNIT-II

Transmission Media:

Guided Transmission Media, Wireless Transmission. Data Encoding: Digital Data-Digital Signals, Digital Data-Analog Signals, Analog Data-Digital Signals, Analog Data-Analog Signals.

UNIT-III

Data Communication Interface:

Asynchronous and Synchronous Transmission, Line Configurations, Interfacing. Data Link Control Flow Control, Error Detection, Error Control, High-Level Data Link Control (HDLC)

UNIT-IV

Data Communications Hardware & Processing Hardware:

Terminals: Introduction, Basic Terminal Components, Enhanced Terminal Components, General-Purpose Terminals, Remote Job Entry Terminals, Transaction Terminals, Clustering of Terminal Devices.

Communications Processing Hardware:

Introduction, Switching Processors, MultidropLins, Multiplexers, Concentrators, Front-End Processors

UNIT-V

Multiplexing:

Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing: Characteristics, TDM Link Control, Digital Carrier Systems, Statistical Time-Division Multiplexing: Characteristics.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2204	
Course Title: DATA COMMUNICATIONS	
CO-1	Students will have the ability to use Data Communications and Networking Protocols and protocol architectures
CO-2	Students will have the ability to develop communication models for providing data transmission facility

CO-3	Students will have the ability to outline Data Communication terminology
CO-4	Students will have the ability to classify various transmission media
CO-5	Students will have the ability to discriminate various types of signals for data transmission and ability to describe data encoding techniques
CO-6	Students will have the ability to describe data communications interface
CO-7	Students will have the ability to apply various flow control , error control techniques of data link control protocols
CO-8	Students will have the ability to use various data communication terminals and processing hardware
CO-9	Students will have the ability to demonstrate multiplexing techniques

SYLLABUS: ADVANCED DATA STRUCTURES (B17 CS 2205)

UNIT-I

Trees: Definition, operations and applications of Binary search trees, AVL trees, Red-Black Trees, Splay trees, Tries and B-Trees, B+ Trees

UNIT-I1

Priority Queues: Heap model and implementations, Binary Heap, Applications of Priority Queues, d-Heaps, Leftist Heaps, Skew Heaps, Binomial Queues structure, operations and Implementation

UNIT-1II

Hashing & External sorting: Hash Table Structure, Hash Function, Collision handling, Separate Chaining, Open Addressing, Rehashing, Extendible hashing, Difference between internal and external sorting, Model and simple algorithm for External sorting, Multi-way Merge, Poly-phase Merge, Replacement selection.

UNIT-1V

Graph algorithms: Representation of graphs, Topological sort, Network flow problems, Applications of Depth first search for finding Bi-connectivity, Euler circuits, strong components, Introduction of NP-Completeness

UNIT-V

Disjoint Set ADT & Amortized analysis: Equivalence relations, Dynamic equivalence problem, Basic data

structure, smart union algorithms, path compression, Analysis of union/find algorithm, applications of ADT Disjoint set, Introduction to amortized analysis, Basic approaches, binary queues, skew heaps, Aggregate analysis, The accounting method, The potential method and Dynamic tables.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS2205	
Course Title: ADVANCED DATA STRUCTURES	
CO-1	Ability to understand various hashing techniques.
CO-2	Ability to write programs to implement sorting techniques
CO-3	Ability to understand concepts related to graph theory.

SYLLABUS: OPERATIONS RESEARCH (B17 ME 2207)

UNIT - I:

Overview of Operations Research, Types of OR Models, Phases of Operations Research– OR Techniques, Introduction to Linear Programming, Formulation of Linear Programming Problem, Graphical Solution; Standard Form of LPP, Basic Feasible Solutions, Unrestricted Variables, Simplex Algorithm, Artificial Variables, Big M Method, Two Phase Simplex Method, Degeneracy, Alternative Optimal, Unbounded Solutions, Infeasible Solutions, Primal And Dual Problems and Their Relations, Dual Simplex Method.

UNIT - II:

Transportation Problem as LPP, Initial Solutions, North West Corner Rule, Lowest Cost Method, Vogel"s Approximation Method, Optimum Solutions of TPP, Degeneracy in Transportation, Transportation Algorithms. Assignment Problem, Assignment Problem as LPP, Hungarian Method, Travelling Salesman Problem, Solutions of TSP.

UNIT - III:

Sequencing Problems, N-Jobs Two Machine Problems, N-Jobs K Machines Problems, Two-JobsM- Machine Problems, Replacement Problems-Individual and Group Replacement Policy, Reliability & System Failure Problems,

UNIT - IV:

Network Representation of A Project, CPM and PERT, Critical Path Calculations, Time – Cost Optimizations, PERT Analysis and Probability Considerations, Resource Analysis in Network Scheduling. Inventory-Factors Effecting Inventory-EOQ, Inventory Problems with and without Shortages, Inventory Problems with Price Breakups.

UNIT – V:

Game Theory: Two Person Zero Sum Games, Mixed Strategy Games and Their Algorithms.

Course Outcomes for Second Year Second Semester Course	
Course Code:B17 ME 2207	
Course Title: OPERATIONS RESEARCH	
CO-1	Ability to solve LPP problems using various methods.
CO-2	Ability to solve transportation and assignment problems using several methods.
CO-3	Analyze the PERT and CPM charts.
CO-4	Ability to solve replacement problems and game theory problems.

OPERATING SYSTEMS AND UNIX PROGRAMMING LAB (B17 CS 2206)

Module I

OS lab familiarization, Home Assignment on Unix commands, Vi editor

Simple C programs using command line arguments, system calls, library function calls, make utility C programs using fork system call to create process and study parent, child process mechanism

C programs to create process chaining, spawning

C programs to handle errors using errno, perror() function

C programs to use pipe system call for inter process communication

Module II

Familiarization of Unix shell programmingSimple shell programming exercises

Shell programming using decision making constructsShell programming using loop constructs

Shell programming for file and directory manipulation

Module III

C programs to study process scheduling (FCFS, Shortest Job First, and Round Robin) C programs to study page replacement (FIFO, Optimal, and LRU page replacement) C programs to study deadlock avoidance and detection

C Programs to simulate free space management.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2206	
Course Title: OPERATING SYSTEMSANDUNIX PROGRAMMING LAB	
CO-1	The student practices UNIX commands, Vi editor, shell commands.
CO-2	The student develops skill in writing C programs using system calls for process management; inter process communication and memory management aspects.
CO-3	The student learns shell programming and develops skill for writing scripts for batch level tasks.

DIGITAL ELECTRONICS AND MICRO PROCESSORS LAB (B17 CS 2207)

DIGITAL EXPERIMENT

Verification of Truth tables of OR, AND, NOT, NAND, NOR, EX-OR gates(by using 7400-series)

Construction of gates using NAND, NOR gates.

Construction of Half and Full adders and verifying their truth tables. Operation and verifying truth tables of flip-lops-RS, D and JK using IC"sUp/Down counters using JK flip-flops.

4-bit shift right and left registers using JK flip-flops.

MICROPROCESSORS: 8085

Binary Addition of „N" 8-bit numbers.Binary to BCD conversion

Arranging –Ascending/descending order

To find the largest /smallest numbers in the array.ASCII to HEXA & HEXA to ASCII conversion.

MICROPROCESSORS: 8086

Liner Search

Factorial of a given number To copy string from S1 to S2To find GCD and LCD

MICROPROCESSOR INTERFACING WITH 8085

Matrix display

Light Rollet

Traffic Light.

Simple calculator

Stepper Motor controller

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2207	
Course Title: DIGITAL ELECTRONICS & MICROPROCESSOR LAB	
CO-1	The student understands the logic gates, half adders, full adders and flip-flops to design a circuit.
CO-2	The student develops the skill of writing microprocessor programming.
CO-3	The student understands the interfacing of microprocessor with stepper motor, R-2R ladder.

SYLLABUS: COMPETETIVE PROGRAMMING LAB (B17 CS 2208)

Introduction to Python

- The basic elements of python
- Branching Programs
- Control Structures
- Strings and Input
- Iteration

Functions, Scoping and Abstraction

- Functions and scoping
- Recursion
- Files

Classes and Object-Oriented Programming

- Abstract Data Types and Classes
- Inheritance
- Encapsulation and Information Hiding

Algorithms and Data structures

- Sequences
- Lists
- Item Ordering
- Two-Dimensional Sequences
- The Minmax

Sets and Maps

- Playing Sudoku
- Sets
- Hashing
- The HashSet Class
- Solving Sudoku

Maps

- Memorization
- Correlating Two Sources of Information

Membership Structures

- Bloom Filters
- The Trie Data type

Balanced Binary Search Trees

- Binary Search Trees
- AVL Trees
- Splay Trees
- Iterative Splaying
- Recursive Splaying

B-Trees

- B-Tree Implementation
- B-Tree Insert
- B-Tree Delete

Project

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 CS 2208	
Course Title: COMPETETIVE PROGRAMMING LAB	
CO-1	Write programs using python programming.
CO-2	Write algorithms.
CO-3	Implement various data Structures.
CO-4	To apply object oriented mechanisms.
CO-5	To Implement various Advance data Structures like AVL trees, B-Trees, Splay trees etc.

PROFESSIONAL ETHICS & HUMAN VALUES (B17BS 2204)
(Common to CSE, ECE & IT)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, Human Values – Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics , Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:

Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:

Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexual harassment at work place.

UNIT – V

Global Issues:

Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living, concept of Harmony in life.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2204	
Course Title: PROFESSIONAL ETHICS&HUMAN VALUES	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Regulation: R17					III / IV - B.Tech. I- Semester				
COMPUTER SCIENCE ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Course**	**C**	**Cr**	**L**	**T**	**Lab**	**I_M**	**E_M**	**Total Marks**
B17 CS3101	Computer Networks	ES	3	3	1	--	30	70	100
B17 CS3102	Web Technologies	ES	3	3	1	--	30	70	100
B17 CS3103	Formal Languages & Automata Theory	ES	3	3	1	--	30	70	100
B17 CS3104	Database Management Systems	ES	3	3	1	--	30	70	100
B17 CS3105	Application DevelopmentUsing Java	ES	3	3	1	--	30	70	100
#OE	Open Elective	ES	3	3	1	--	30	70	100
B17 C3108	Database Management Systems Lab.	ES	2	--	--	3	50	50	100
B17 CS3109	Application DevelopmentLab.	ES	2	--	--	3	50	50	100
B17 BS3101	Problem Solving & Linguistic Competence	BS	1	--	3	--	30	70	100
B17 BS3103	Advanced Coding	BS	1	--	--	3	50	50	100
Total			**24**	**18**	**9**	**9**	**360**	**640**	**1000**

#OE	B17CS3106	Embedded Systems
	B17CS3107	Cyber Security
	B17EC3109	Digital Signal Processing
	B17ME3110	Industrial Robotics

COMPUTER SCIENCE ENGINEERING

SYLLABUS: COMPUTER NETWORKS (B17CS3101)

UNIT-I

Switched Networks: Circuit-Switching Networks, Circuit Switching Concepts, Soft switch Architecture, Packet Switching Principles, X.25, Frame Relay.

Asynchronous Transfer Mode: Protocol Architecture, ATM Logical Connections, ATM Cells, ATM Service Categories, Routing in Switched Networks.

UNIT-II

Congestion Control in Switched Data Networks: Effects of Congestion, Congestion Control, Traffic management, Congestion Control in Packet Switched networks, Principles of Cellular Networks

Local Area Network Overview: Background, Topologies and transmission media, LAN Protocol Architecture, Bridges, Layer 2 and Layer 3 Switches,

UNIT-III

High Speed LANs: The Emergence of High Speed LANs, Ethernet.

Wireless LANs: Overview, Wireless LAN Technology, IEEE802.11 Architecture and Services.

UNIT-IV

Internet Protocols: Basic protocol Functions, Principles of Internetworking, Connectionless Internetworking, Internet Protocol.

Internet Operation: Multicasting, Routing Protocols: Autonomous Systems & Approaches to Routing.

UNIT-V

Transport protocols: Connection oriented Transport Protocol Mechanisms: Reliable Sequencing Network Service, TCP: TCP Services, TCP Header Format, TCP Mechanisms, UDP.

Application Layer protocols: Overview of DNS, Electronic Mail, FTP, TFTP, BOOTP, HTTP Protocols, World Wide Web.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3101	
Course Title: COMPUTER NETWORKS	
CO-1	Distinguish between Circuit Switching and Packet Switching approaches.
CO-2	Apply various concepts of ATM networks.
CO-3	Distinguish between various types of Networks.
CO-4	Apply various Congestion Control Techniques.
CO-5	Know Internetwork Operation.
CO-6	Know various Connection Oriented Transport Control Mechanisms.

SYLLABUS: WEB TECHNOLOGIES (B17CS 3102)

UNIT-I

Introduction to HTML, Core Elements, Links and Addressing, Images, Text, Colors and Background, Lists, Tables and Layouts, Frames, Forms, Cascading Style Sheets.

Introduction to Java Scripts, Elements of Objects in Java Script, Dynamic HTML with JavaScript.

UNIT-II

Document type definition, XML Syntax, XML Schemas, Document Object model, Presenting XML, Using XML Processors.

UNIT-III

Introduction to Servlet, Servlet Life Cycles, Servlet Basics, Tomcat Web Server, Configuring Apache Tomcat, Handling Client Request and Response, Handling Cookies, Session Tracking.

UNIT-IV

Introduction to PHP, Language Basics, Functions, Strings, Arrays.

MYSQL Installation, Accessing MySQL Using PHP, Form Handling, Cookies, Sessions, and Authentication, Tables, Inserting Data into Tables, Selecting Data from a Table, Updating Table, Deleting data from Table, Webpage creation.

UNIT-V

XML AJAX, AJAX introduction, AJAX XMLHttp, AJAX Request, AJAX Response, AJAX XML file, AJAX PHP, AJAX database, AJAX Examples and AJAX applications

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3102	
Course Title: WEB TECHNOLOGIES	
CO-1	Students will be able to construct web based applications and Identify where data structures are appearing in them.
CO-2	Students will be able to connect java programs to different databases.
CO-3	Students will be able to develop EJB programs.

FORMAL LANGUAGES AND AUTOMATA THEORY (B17CS3103)

UNIT – I Finite Automata

Why Study Automata Theory? The Central Concepts of Automata Theory, Finite Automation, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with - Transitions, Eliminating -Transitions, Minimization of Finite Automata, Mealy and Moore Machines, Equivalence of Mealy and Moore Machines, Applications and Limitation of Finite Automata.

UNIT – II: Regular Expressions

Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Finite Automata and Regular Expressions, Conversion of Regular Expression to NFA with - Transitions, Conversion of DFA to Regular Expression, Arden"s Theorem, Pumping Lemma for Regular Languages, Applications of pumping lemma, Closure Properties of Regular Languages, Regular Grammar, Conversion of Finite Automata to Regular Grammars, Applications of Regular Expressions.

UNIT – III: Context Free Grammars

Grammars, Classification of Grammars, Chomsky Hierarchy, Context Free Grammar, Leftmostand Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, -Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma for CFL, Closure Properties, Applications of Context Free Grammars.

UNIT – IV: Pushdown Automata

Pushdown Automata, Definition, Graphical Notation, Instantaneous Description, Language Acceptance of pushdown Automata-Acceptance by empty stack and final state, Design of Pushdown Automata-Deterministic and Non-Deterministic PDA, Conversion of Pushdown Automata to Context Free Grammars, Conversion of Context Free Grammars to Pushdown Automata, Application of Pushdown Automata.

UNIT – V: Turning Machine

Turing Machine, Definition, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church"s Thesis, Universal Turing Machine, Introduction to Decidable and Undecidable Problems, Halting Problem of Turing Machines, Post"s Correspondence Problem, Modified Post"s Correspondence Problem, Introduction to Classes of P and NP, NP-Hard and NP-Complete Problems.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3103	
Course Title: FORMAL LANGUAGES AND AUTOMATA THEORY	
CO-1	Ability to classify machines by their power to recognize languages,
CO-2	Ability to explain finite state machines to solve problems in computing,
CO-3	Ability to explain deterministic and non-deterministic machines,
CO-4	Ability to explain the concepts of Turing Machines, Undesirability, church thesis.

DATABASE MANAGEMENT SYSTEMS (B17CS3104)

UNIT-I: Introduction: Introduction to File Processing System and DBMS, Disadvantages of FPS, Advantages of DBMS, Introduction to RDBMS, Levels of abstraction, Data Independence, types of users, Duties of DBA, Structure of a DBMS.

UNIT-II: Relational Model and SQL: Relational model- relation, relation schema and relation instance, Integrity constraints and relation algebra, SQL Preliminaries, Basic form of SQL Query, Nested Queries, Joins, Set Operations, Aggregate Operators, Data Definition Language Commands-create table, alter table and drop table commands, Integrity Constraints in SQL, Null values, Data Manipulation Language Commands-insert, update and delete commands.

UNIT-III: Database Design: Basic Steps in Database Design, ER Diagrams, Entities, Attributes and Entity Sets, Relationships & Relationship Sets, Features of the ER Model, Conceptual Database Design, Logical Database Design, Triggers, Views, Sequences, JDBC.

UNIT-IV: Normalization: Anomalies of redundancy, Functional Dependencies, Normal Forms- 1NF, 2NF, 3NF and BCNF, Properties of Decomposition, Normalization-Loss-less join decomposition into BCNF, Multi-valued dependencies and 4NF.

UNIT-V: Transaction Management : The ACID Properties, Transactions & Schedules, Concurrent Execution of Transactions, Concurrency Control- Serializability and Recoverability, Two Phase Locking protocol, Dealing with Deadlocks and Time Stamp Ordering Protocol, Crash Recovery- Log-based Recovery, The Log, Other Recovery-Related Structures, The Write-Ahead Log Protocol, Check pointing, ARIES.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS3104	
Course Title: DATABASE MANAGEMENT SYSTEMS	
CO-1	Generalize the basic concepts of DBMS and RDBMS.
CO-2	Prepare SQL commands for defining, constructing and manipulating databases.
CO-3	Apply conceptual and logical database design using data models.
CO-4	Apply normalization to tables.
CO-5	Manage concurrent transactions.
CO-6	Apply databases Recovery Techniques.

APPLICATION DEVELOPMENT USING JAVA (B17CS3105)

UNIT-I

Introduction: Classes, Objects and Methods, Constructors, Arrays, Strings and vectors, Inheritance, Interface, Abstract Class, Packages.

Multi-Threaded Programming and Exceptions: Introduction on Thread, Life cycle of a Thread, Thread Priorities, Synchronization, Implementing the Runnable interface. Exceptions: Types of Errors, Types of Exceptions, throwing our own Exception

UNIT-II

Applet Programming and Basic AWT Components: Introduction to Applet, Applet Life Cycle, Passing parameters to Applet, Displaying Numerical Values. AWT: container, Canvas, Panel, Frame, Basic AWT user interface controls: (Button, Checkbox, Checkbox Group, Scrollbars, Text Field, Text Area, Radio button and List box).

Event-handling and Layout Managers: Handling events with classes, handling events by implementing interfaces, Organizing Windows with Layout Managers (Flow Layout, Border Layout, Card Layout, Grid Layout, Grid Bag Layout).

UNIT-III

Java Swings: Introduction to J Swings, Components and Containers, the Swing Packages, Exploring Swing (J Frame, J Buttons, J Table, J Password Field, J Tabbed pane, J Scrollpane, J Trees)JSP: Introduction to JSP, JSP Elements(JSP Declaration, JSP Scripting, JSP Expression, JSP Comments), JSP Directives, implicit Objects, JSP Program for Database Access.

UNIT-IV

Database Access: Structure of JDBC, JDBC Drivers, JDBC Architecture, JDBC API (java .sql. package), Connecting to the Database, JAVA Database connection program for MS Access, Oracle, MySQL and NOSQL.

UNIT-V

Input /Output, NIO: The I/O Classes and Interfaces, I/O Exceptions, the Stream Classes, the Byte Streams, the Character Streams, NIO Fundamentals

Network Programming: The Networking Classes and Interfaces, Inet Address, TCP/IP Client Sockets, URL Connection, Http URL Connection, TCP/IP Server Sockets, Datagram, Datagram Socket, Datagram Packet

Course Outcomes for Third Year First Semester Course	
Course Code:B17 CS3105	
Course Title: APPLICATION DEVELOPMENT USING JAVA	
CO-1	Able to do projects for web based and internet applications.
CO-2	Understand multitasking and multiprogramming development
CO-3	Able to do network programming.
CO-4	Able to Construct Web application using Java Server Pages

SYLLABUS: EMBEDDED SYSTEMS
(B17CS3106)
(Open Elective)

UNIT-I

Examples of Embedded Systems – Typical Hardware – Memory – Microprocessors – Busses – Direct Memory Access – Introduction to 8051 Microcontroller – Architecture-Instruction set – Programming-Microprocessor Architecture – Interrupt Basics – The Shared-Data problem – Interrupt Latency.

UNIT-II

Round–Robin Architecture - Round–Robin with Interrupts Architecture - Function-Queue- Scheduling Architecture – Real-Time Operating Systems Architecture – Selection ofArchitecture.

UNIT-III

Tasks and Task States – Tasks and Data – Semaphores and Shared Data – SemaphoreProblems – Semaphore variants, Message Queues – Mailboxes – Pipes – Timer Functions – Events – Memory Management – Interrupt Routines in RTOS Environment.

UNIT-IV

RTOS design – Principles – Encapsulation Semaphores and Queues – Hard Real-Time Scheduling Considerations – Saving Memory Space – Saving Power.

UNIT-V

Host and Target Machines – Linker/Locator for Embedded Software- Getting Embedded Software into the Target System, Testing on your Host Machine – Instruction Set Simulators – Laboratory Tools used for Debugging.

Course Outcomes for Third Year First Semester Course	
Course Code:B17 CS 3106	
Course Title: EMBEDDED SYSTEMS	
CO-1	To describe the differences between general computing system and Embedded System.
CO-2	To recognize the classification of Embedded System. .
CO-3	To understand various architectures of Embedded System.
CO-4	To design Real Time Embedded System using the concepts of RTOS.
CO-5	To load embedded software on Host machine.
CO-6	To test Host machine

SYLLABUS: CYBER SECURITY (B17CS3107)
(Open Elective)

UNIT- I

Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? , Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

Cyber offenses: How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT –II

Cybercrime Mobile and Wireless Devices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT –III

Tools and Methods Used in Cybercrime:

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft)

UNIT –IV

Cybercrimes and Cyber security:

Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awarenessprogram, Continuing Strategies.

UNIT –V

Understanding Computer Forensics:

Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Computer Forensics from Compliance Perspective, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing, Antiforensics

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3107	
Course Title: CYBER SECURITY	
CO-1	Cyber Security architecture principles
CO-2	Identifying System and application security threats and vulnerabilities.
CO-3	Identifying different classes of attacks
CO-4	Cyber Security incidents to apply appropriate response
CO-5	Describing risk management processes and practices
CO-6	Evaluation of decision making outcomes of Cyber Security scenarios

SYLLABUS: DIGITAL SIGNAL PROCESSING (B17EC3109)

(Open Elective)

UNIT-I: Discrete-Time Signals and Systems: (Oppenheim &Proakis)

Introduction to Digital Signal Processing, Basic elements of a DSP system, Advantages of Digital SP over Analogy SP, Discrete-time signals and systems, DT-LTI systems described by Linear constant–coefficient difference equations, Properties & Analysis of DT-LTI systems, Discrete linear convolution, Frequency domain representation of DT Signals and Systems, DTFT, Review of the Z-transform, Properties, Inverse Z-transform, Analysis of DT-LTI systems in Z-Domain, System function, One-sided Z-transform, Solution of difference equations, Structures and Realization of Digital Filters, Direct-I, II, series and parallel forms.

UNIT-II: Discrete Fourier Transform (DFT) and Fast Fourier Transform Algorithms (FFT): (Oppenheim &Proakis)

Frequency analysis of discrete time signals, DFS, Properties of DFS, Sampling of DTFT, DFT, Properties of DFT, Circular and linear convolution of sequences using DFT, Efficient computation of DFT, Radix–2 Decimation–in–Time(DIT) & Decimation–in–Frequency(DIF) FFT Algorithms, Inverse FFT.

UNIT-III: Design of IIR Digital Filters: (Oppenheim &Proakis)

General considerations in Filter design, Analog filter approximations– Butterworth and Chebyshev, Frequency response specifications; Design of IIR digital filters from analog filters, Bilinear Transformation Method, Impulse Invariance Technique, and Low-pass filter Design examples.

UNIT-IV: Design of FIR Digital Filters: (Oppenheim &Proakis)

Characteristics of FIR Digital Filters, Design of Linear Phase FIR digital Filters using Windows, Effect of Window selection & filter length on filter frequency response, Design examples, Comparison of IIR and FIR Filters.

UNIT-V: DSP Applications and Fundamentals of Multirate Digital Signal Processing: (SKMitra)

Overview of DSP applications, Spectral analysis of sinusoidal signals using FFT, Sub bandcoding of speech signals, Signal compression, Finite precision arithmetic effects.

Introduction to Multirate DSP, Basic sampling rate alteration devices: up sampler, down sampler, Time and Frequency domain characterization of up/down samplers, Interpolatorand decimator. Interactive programing based examples.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 EC3109	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental tradeoffs. Carry-out LTI system analysis using convolution

	& Z-transform.
CO-2	Carryout data analysis &spectrum analysis using FFT
CO-3	Design of IIR digital filters to meet specifications
CO-4	Design of FIR digital filters to meet specifications
CO-5	Knows multi-rate signal processing aspects & DSP applications

INDUSTRIAL ROBOTICS (B17ME3110)
(Open Elective)

UNIT - I

INTRODUCTION: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation scheme, work volume, robot drive systems, control systems and dynamic performance, precision of movement.

CONTROL SYSTEM AND COMPONENTS: basic concepts and motion controllers, control system analysis, robot actuation and feedback components, Positions sensors, velocity sensors, actuators, power transmission systems, robot joint control design.

UNIT - II

MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation, forward and inverse transformations, homogeneous transformations, manipulator path control, robot arm dynamics, configuration of a robot controller.

UNIT - III

END EFFECTORS: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics.

MACHINE VISION: Functions, Sensing and Digitizing-imaging devices, Lighting techniques, Analog to digital single conversion, image storage: Image processing and Analysis-image data reduction, Segmentation, feature extraction, Object recognition. Training the vision system, Robotic application.

UNIT - IV

ROBOT PROGRAMMING: Lead through programming, Robot program as a path in space, Motion interpolation, WAIT, SIGNAL AND DELAY commands, Branching, capabilities and Limitations of lead through methods.

ROBOT LANGUAGES: Textual robot Languages, Generations of robot programming languages, Robot language structures, Elements and function.

UNIT - V

ROBOT CELL DESGIN AND CONTROL: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detection, Work cell controller.

ROBOT APPLICATION: Material transfer, Machine loading/unloading, Processing operation, Assembly and Inspection, Future Application.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME3110	
Course Title: INDUSTRIAL ROBOTICS	
CO-1	Distinguish between fixed automation and programmable automation.
CO-2	Identify various components of robot.
CO-3	Select appropriate type of actuator for a joint.
CO-4	Illustrate robot applications in manufacturing.
CO-5	Analyze kinematics of a robot.

SYLLABUS: DATABASE MANAGEMENT SYSTEMS LAB (B17CS3108)

Features of two commercial RDBMS package such as ORACLE/DB2, MS Access, MYSQL & Structured Query Language (SQL) used with the RDBMS.

Laboratory Exercises Should Include

a. Defining Schemas for Applications
b. Creation of Database
c. Writing SQL Queries
d. Retrieve Information from Database,
e. Creating Views
f. Creating Triggers
g. Normalization up to Third Normal Form
h. Use of Forms
i. Report Writing

II. Some sample applications are given below:

1. Accounting Package for Shops
2. Database Manager for Magazine Agency or Newspaper Agency
3. Ticket Booking for Performances
4. Preparing Greeting Cards & Birthday Cards
5. Personal Accounts - Insurance, Loans, Mortgage Payments, Etc.
6. Doctor's Diary & Billing System
7. Personal Bank Account
8. Class Marks Management
9. Hostel Accounting
10. Video Tape Library
11. History of Cricket Scores
12. Cable TV Transmission Program Manager
13. Personal Library
14. Sailors Database
15. Suppliers and Parts Database

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3108	
Course Title: DATABASE MANAGEMENT SYSTEMS LAB	
CO-1	The student is exposed to a commercial RDBMS environment such as ORACLE.
CO-2	The student will learn SQL commands for data definition and manipulation.
CO-3	The student applies conceptual design.
CO-4	The student applies Logical data base design.
CO-5	The student takes up a case study and applies the design steps.

SYLLABUS: APPLIATION DEVELOPMENT LAB B17CS3109)

CYCLE-1:

1. Write a java program to implement Interface.
2. Write a java program to implement Packages.
3. Write a java program to manipulate the Strings.
4. Write a java program that implements thread class methods.
5. Write a java program that handles all mouse events and shows the event name at the centerof the window when a mouse event is fired. Use adapter classes.
6. Write a java program to demonstrate the key event handlers.
7. Write a java program to display the table using labels in grid layout and Flow layout.
8. Write an applet program to Pass a parameters to Applet
9. Write a program to implement an application using AWT Components
10. Write a java program to implement J Tree.
11. Write a java program to implement J Tabbed Pane
12. Write a java program to implement J Scroll pane
13. Write JSP Program to validate user name and password on server side?
14. Write an online book purchase application using JSP. Consider a login validation page and one billing page for bill payment process. Assume any information if required?
15. Write JSP Program for Database Access.
16. Write a java program by using JDBC to execute a SQL query for a database and display the results.
17. Write a java program to display the Header information of the given URL
18. Write a java program to split the given URL.

19. Implementing one-one chat Application without threads
20. Write a java program for Datagram server and Client interaction as per given below.
    i). A program to create Datagram server to send a message to client.
    ii). A program to create Datagram client to receive the message sent by the server

CYCLE-2:

Each batch (only two members) should develop one project out of this list. Project has to develop by using HTML, CSS, JS, PHP and MYSQL.

1. Design Airlines Ticket Reservation System
2. Online Shopping
3. Design Library Information system.
4. Design Gram Panchayat Information system for House tax, water tax, wealth tax, Library

tax collection, phone bill, Electricity bill collection.

5. Design student information system portal which maintain attendance, marks etc.
6. Design online examination system.
7. Event management System.
8. Car Rental System.
9. Cinema Booking System.
10. Hotel Management System.
11. Complaint management System.
12. Online voting system.
13. Student Result System.
14. Car Comparison System Project.
15. Selling your old stuff.
16. Aquaculture Updates.
17. Timesheet using PHP
18. Online Help Desk using PHP
19. Online marriage beuro system
20. EAMCET web counseling

Final copy of Documentation has to submit by the batch as following:

1. Abstract
2. Modules
3. Software Requirement Specifications
4. Database Connectivity
5. Output
6. Code

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3109	
Course Title: APPLIATION DEVELOPMENT LAB	
CO-1	Compare and Contrast HTML, DHTML, CSS, JavaScript and other Web technologies.
CO-2	Implement JavaScript Language to perform functionalities at client side validations.
CO-3	Assess and evaluate the role of "WEBSERVERS" for the management and delivery of electronic information.
CO-4	Develop Web based applications by PHP to have an interactive application such as Client Server Architecture.

PROBLEM SOLVING & LINGUISTIC COMPETENCE (B17BS3101)

(Common to all Branches)

Part-A: Verbal and Soft Skills-I

Grammar: (VA)

Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns-number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause
, conditional and relative clauses), phrases(use of the phrases, phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees of comparison, modifiers, determiners, identifying errors in a given sentence, correcting errors in sentences.

Vocabulary: (VA)

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants(with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meanings of the same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning: (VA)

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage: (VA)

Sentence completion (with emphasis on signpost words and structure of a sentence), supplyinga suitable

Beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:

Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis – Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for Goal Setting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - Stress Management, CV Making and CV Review.

Part-B: Quantitative Aptitude –I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, introducing the concept of ratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work, Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of time and distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.
Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships,shares and dividends Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking, directions Problems of how to find the next number in the series, Finding the missing number and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directions north, south, east, west.
Data sufficiency, Syllogisms Easy sums to understand data sufficiency, Frequent mistakes while doing data sufficiency, Syllogisms Problems.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3101	
Course Title: PROBLEM SOLVING & LINGUISTIC COMPETENCE	
	Part-A: Verbal and Soft Skills-I
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.

CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
	Part-B: Quantitative Aptitude -I
CO-6	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-7	Accurate solving problems on time and distance and units related solutions.
CO-8	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-9	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry.
CO-10	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, GATE for further studies.

SYLLABUS: ADVANCED CODING
(B17BS3103)

UNIT I Review Coding essentials and modular programming

Introduction to Linear Data, Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding.

Introduction to modular programming: Formation of methods, Methods: Signature and definition, Inter-method communication, Data casting & storage classes, Recursions

UNIT II Linear Linked Data

Introduction to structure pointer, Creating Links Basic problems on Linked lists, Classical problems on linked lists. Circular Linked lists, Operations on CLL, Multiple links, Operations on Doubly linked lists

UNIT III Abstract Data-structures

Stack data-structure, Operations on stack, Infix/Prefix/Post fix expression evaluations, Implementation of stack using array, Implementation of stack using linked lists.

Queue data-structure: Operations on Queues, Formation of a circular queue, Implementation of queue using stack, Implementation of stack using array, Implementation of stack using linked lists

UNIT IV Running time analysis of code and organization of linear list data

Code evaluation w.r.t running time, Loop Complexities, Recursion complexities, Searching techniques: sequential Vs. binary searching.

Organizing the list data, Significance of sorting algorithms, Basic Sorting Techniques: Bubblesort, selection sort, Classical sorting techniques: Insertion sort, Quick sort, Merge sort.

UNIT V Standard Library templates and Java collections

Introduction to C++ language features, working on STLs, Introduction to Java as Object Oriented language, Essential Java Packages, Coding logics.

Note: This course should focus on Problems

Course Outcomes for Third Year First Semester Course	
Course Code: B17BS3103	
Course Title: ADVANCED CODING	
CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

Regulation: R17	**III / IV - B.Tech. II- Semester**

COMPUTER SCIENCE ENGINEERING
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION & EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

CodeNo.	Name of the Subject	C	Cr	L	T	Lab	I_M	E_M	Total Marks
B17 CS3201	Data Warehousing & Data Mining	ES	3	3	1	--	30	70	100
B17 CS3202	Object Oriented Software Engineering	ES	3	3	1	--	30	70	100
B17 CS3203	Design and Analysis of Algorithms	ES	3	3	1	--	30	70	100
B17 CS3204	Artificial Intelligence	ES	3	3	1	--	30	70	100
B17 CS3205	Compiler Design	ES	3	3	1	--	30	70	100
ELE-I	Elective-I	ES	3	3	1	--	30	70	100
B17 CS3210	Software Engineering Mini Project Lab	ES	2	--	--	3	50	50	100
B17 CS3211	Network Programming Lab	ES	2	--	--	3	50	50	100
B17 BS3201	Employability Skills	BS	1	--	3	--	30	70	100
B17 BS3204	Competitive Coding	BS	1	--	--	3	50	50	100
B17 BS3206	IPR & PATENTS	BS	--	--	2	--	--	--	--
Total			**24**	**18**	**11**	**9**	**360**	**640**	**1000**

Elective-I	B17CS3206	Cloud Computing
	B17CS3207	Mobile Computing
	B17CS3208	Distributed Systems
	B17CS3209	Information Retrieval Systems

SYLLABUS: DATA WAREHOUSING & DATA MINING (B17CS3201)

UNIT-I

Introduction to Data Mining: Evolution of I T into DBMS, Motivation and importance of Data Warehousing and Data Mining, Kinds of Patterns, Technologies, Basic Data Analytics: Data Objects and Attributes Types, Statistical Descriptions of Data, Data Visualization, Estimating Data Similarity and Dissimilarity, Major Issues in Data Mining, Data Mining Applications.

UNIT-II

Data Processing and OLAP Technology: Data Cleaning, Data Integration, Data Reduction, Data Transformation, Discretization and Concept Hierarchy Generation. Basic Concepts of Data warehouse, Data Modelling using Cubes and OLAP, DWH Design and usage, Implementation using Data Cubes and OLAPs.

UNIT-III

Mining Frequent Patterns Based on Associations and Correlations: Basic Concepts, Frequent Item set Mining Methods: Apriori Algorithm, Association Rule Generation, Improvements to A Priori, FP- Growth Approach, Mining Frequent Patterns using Vertical Data Formats, Mining Closed and Max Patterns, Pattern Evaluation Methods, mining in multilevel, multi-dimensional space.

UNIT-IV

Classification & Prediction: Basic Concepts, Decision Tree Induction, Bayes Classification, Rule- Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy Advanced Methods: Classification by Back Propagation.

UNIT-V

Cluster Analysis: Basic Concepts and issues in clustering, Types of Data in Cluster Analysis, Partitioning Methods-K-Means, K-Medoids, Hierarchical Methods-Agglomerative versus Divisive-Distance Measures in Algorithmic Methods, Birch, Density Based Methods- DBSCAN, OPTICS, Grid Based Methods-STING.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3201	
Course Title: DATA WAREHOUSING & DATA MINING	
CO-1	The student understands the differences between OLTP and OLAP.
CO-2	The student learns how data cube technology supports structuring and querying high dimensional data.
CO-3	The student is introduced to similarity, distance, information gain and other performance and error metrics used for data mining.
CO-4	The student is introduced to association rule mining, supervised and unsupervised learning and the corresponding classification and clustering approaches involving decision trees, Bayesian approaches, model based and agglomerative approaches.

SYLLABUS: OBJECT ORIENTED SOFTWARE ENGINEERING (B17CS3202)

UNIT-I

Introduction to Object Oriented Software Engineering: Nature of the Software, Types of Software, Software Engineering Projects, Software Engineering Activities, Software Quality, Introduction to Object Orientation

Software Process Models: Waterfall Model, Opportunistic Model, Phased Released Model, Spiral Model, Evolutionary Model, And Concurrent Engineering Model.

UNIT-II

Requirements Engineering: Domain Analysis, Problem Definition and Scope, Requirements Definition, Types of Requirements, Techniques for Gathering and Analyzing Requirements, Requirement Documents, Reviewing, Managing Change in Requirements.

Unified Modeling Language: Introduction to UML, Modeling Concepts, Types of UML Diagrams with Examples;

UNIT-III

User-Centred Design: Characteristics of Users, Developing Use - Case Models of Systems, Use-Case Diagram, Use- Case Descriptions, Basics of User Interface Design, Usability Principles, User Interfaces.

Class Design and Class Diagrams: Essentials of UML Class Diagrams, Associations and Multiplicity, Other Relationships, Generalization, Instance Diagrams, Advanced Features of Class Diagrams, Interaction and Behavioural Diagrams: Interaction Diagrams, State Diagrams, Activity Diagrams, Component and Deployment Diagrams.

UNIT-IV

Software Design and Architecture: Process of Design, Principles Leading to Good Design, Techniques for Making Good Design Decisions, Good Design Document; Pattern Introduction, Design Patterns: Abstraction-Occurrence Pattern, General Hierarchical Pattern, Play-Role Pattern, Singleton Pattern, Observer Pattern, Delegation Pattern, Adaptor Pattern, Façade Pattern, Immutable Pattern, Read-Only Interface Pattern and The Proxy Pattern; Software Architecture Contents of Architecture Model, Architectural Patterns: Multilayer, Client-Server,Broker, Transaction Processing, Pipe & Filter and MVC Architectural Patterns

UNIT-V

Software Testing: Overview of Testing, Testing Concepts, Testing Activities, Testing Strategies, Unit Testing, Integration Testing, Function Testing, Structural Testing, Class Based Testing Strategies, Use Case/Scenario Based Testing, Regression Testing, Performance Testing, System Testing, Acceptance Testing, Installation Testing, OO Test Design Issues, TestCase Design, Quality Assurance, Root Cause Analysis, Post-Mortem Analysis. Software Process Management: Introduction to Software Project Management, SoftwareEngineering Teams, Project Scheduling, Tracking and Monitoring.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3202	
Course Title: OBJECT ORIENTED SOFTWARE NGINEERING	
CO-1	Ability to define a problem and perform Requirements Engineering.
CO-2	Ability to draw UML diagrams for the requirements gathered.
CO-3	Ability to design various aspects of the system
CO-4	Ability to implement the designed problem in Object Oriented Programming Language and test whether all the requirements specified have been achieved or not.
CO-5	Able to apply various testing approaches to test the system
CO-6	Able to use various Process management activities

SYLLABUS: DESIGN AND ANALYSIS OF ALGORITHMS (B17CS3203)

UNIT-I

INTRODUCTION: Algorithm specification, Recursive Algorithms, Performance analysis, Space Complexity, Time Complexity, Asymptotic Notation, Practical Complexities Performance Measurement, Priority queues, Heaps, Heap Sort, Sets and Disjoint set union, Union and Find Operations

DIVIDE AND CONQUER :General method, Binary search, Finding maximum and minimum, Mergesort, Quicksort, Performance Measurement , Selection Problem, A Worst-Case Optimal Algorithm , Implementation of Select2,Strassen"s matrix multiplication, Convex hull Problem, Quick Hull Algorithm

UNIT-II

THE GREEDY METHOD : General method, Knapsack problem, Tree vertex splitting, Job sequencing with deadlines, Minimum cost spanning trees, Prim"s algorithm, Kruskal"s algorithm, Optimal storage on tapes, Optimal merge patterns ,Huffman coding, Single source shortest paths

UNIT-III

DYNAMIC PROGRAMMING: General method, Multistage graphs, All pairs shortest paths, Single source shortest paths with general weights, Optimal binary search trees, String editing, 0/1Knapsack, Reliability design, The travelling salesperson problem

UNIT-IV

BACKTRACKING: General method, 8-Queens problem, Sum of subsets, Graph coloring,Hamiltonian cycles, Knapsack problem

BRANCH AND BOUND: The method, Least Cost (LC) Search, The15-puzzle problem, Control abstractions for LC-Search, FIFO Branch-and-Bound, LC Branch-and-Bound, 0/1 Knapsack problem, Travelling sales person problem

UNIT-V

ALGEBRAIC PROBLEMS and LOWER BOUND THEORY: The method, Evaluation and interpolation, Fast Fourier Transform, Modular arithmetic, Comparison trees, Ordered Searching, Sorting, Selection, Oracles and adversary arguments, Merging, Largest and Second largest

NP-HARD AND NP-COMPLETE PROBLEMS: Basic concepts, Nondeterministic Algorithms, The Classes NP-hard and NP-complete

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3203	
Course Title: DESIGN AND ANALYSIS OF ALGORITHMS	
CO-1	Students will be able to Argue the correctness of algorithms using inductive proofs and invariants and Analyze worst-case running times of algorithms using asymptotic analysis.
CO-2	Describe the various paradigms of design when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm and synthesize them
CO-3	Students will be able to Compare between different data structures. Pick an appropriate data structure for a design situation

SYLLABUS: ARTIFICIAL INTELLIGENCE (B17CS3204)

UNIT-I

Introduction to Artificial Intelligence: Artificial Intelligence, AI Problems, AI Techniques, Defining the Problem as a State Space Search, Problem Characteristics, Production Systems.

Search Techniques: Issues in The Design of Search Programs, Un-Informed Search, BFS, DFS; Heuristic Search Techniques: Generate-And- Test, Hill Climbing, Best-First Search, A* Algorithm, Problem Reduction, AO*Algorithm, Constraint Satisfaction, Means-Ends Analysis.

UNIT-II

Knowledge Representation using Rules: Procedural Vs Declarative Knowledge, Logic programming, Forward Vs Backward Reasoning, Matching Techniques, Partial Matching, RETE Matching Algorithm ,Overview of LISP and PROLOG.

Structured Representations of Knowledge: Semantic Nets, Partitioned Semantic Nets, Frames, Conceptual Dependency and Scripts.

UNIT-III

Symbolic Logic: Propositional Logic, First Order Predicate Logic: Representing Instance and is-a Relationships, Computable Functions and Predicates, Unification & Resolution, Natural Deduction.

Reasoning under Uncertainty: Introduction to Non-Monotonic Reasoning, Truth Maintenance Systems, Logics for Non-Monotonic Reasoning

UNIT-IV

Statistical Reasoning: Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Probabilistic Inference, Bayesian Networks, Dempster- Shafer Theory, Fuzzy Logic: Crisp Sets, Fuzzy Sets, Fuzzy Logic Control, Fuzzy Inferences & Fuzzy Systems.

Natural Language Processing: Steps in the Natural Language Processing, Syntactic Processing and Augmented Transition Nets, Semantic Analysis, NLP Understanding Systems;

UNIT-V

Planning Components of a Planning System, Goal Stack Planning, Non-linear Planning using Constrait Posting, Hierarchical Planning.

Experts Systems: Overview of an Expert System, Architecture of an Expert Systems, Different Types of Expert Systems- Rule Based, Frame Based, Decision Tree based, Case Based, Neural Network based, Black Board Architectures.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3204	
Course Title: ARTIFICIAL INTELLIGENCE	
CO-1	The Student understands AI problem characteristics, state space approach for solving AI problem, Production System framework.
CO-2	The student learns several optimal search strategies and the use of heuristics.
CO-3	The student learns relational, inferential, inheritable and procedural knowledge and the corresponding knowledge representation approaches.
CO-4	The student is introduced to applying AI problem solving approaches to natural language processing, planning and expert systems

SYLLABUS: COMPILER DESIGN (B17CS3205)

UNIT-I

Introduction Language Processing, Structure of a Compiler, Compiler-Construction Tools, The Evaluation of Programming language, The Science of Building a Compiler

Lexical Analysis: The Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognitions of Tokens, The Lexical Analyzer Generator Lex.

UNIT-II

Syntax Analysis: The Role of a Parser, CFG(Definition of CFG, Derivations and Parse Trees, Ambiguity), Writing Grammar(Eliminating Ambiguity, Elimination of Left Recursion and Left Factoring in CFG), Top-down Parsing (Recursive-Descent Parsing and Predictive Parsing), Bottom-up Parsing(Shift Reduce Parsing).

UNIT-III

Introduction to LR Parser(Simple LR Parsing), More Powerful LR Parser(Canonical LR and LALR Parsing), Using Ambiguous Grammars, Error Recovery in LR parser, The Parser Generator Yacc.

Syntax-Directed Translation: Syntax Directed Definitions (Inherited and Synthesized Attributes, Evaluating an SDD at Nodes of Parse Tree), Evolution Order of SDTS (DependencyGraphs, Ordering the Evaluation of Attributes, S-Attributed Definitions and L-Attributed Definitions), Application of SDTS (Construction of Syntax Trees), Syntax Directed Translation Schemes (Postfix Translation Schemes, Parser Stack Implementation of Postfix SDT‟s).

UNIT-IV

Intermediate Code Generation: Variants of Syntax Trees (DAG for Expressions, The Value- Number Method for Constructing DAG's), Three-Address Code (Address and Instructions, Quadruples, Triples), Type Checking (Rules for Type Checking and Type Conversion).

Code Optimization: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, ThePrincipal Sources of Optimization, Introduction to Data-Flow Analysis

UNIT-V

Code Generation: Issues in the Design of a Code Generator, the Target Language, A Simple Code Generator, Code Generation from DAG, Peephole Optimization, Register Allocation and Assignment.

Runtime Environments: Storage Organization, Stack Allocation of Space, Heap Management, Symbol Tables (Symbol Table per Scope, Use of Symbol Tables)

Course Outcomes for Third Year Second Semester Course	
Course Code:B17 CS 3205	
Course Title: COMPILER DESIGN	
CO-1	Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to understand the Compiler tools like LEX, YACC, etc.
CO-2	Ability to describe the different types of parsers. i.e. Top-down, Bottom-up parsers, Construction of SLR, CLR and LALR parse table.
CO-3	Ability to explain Syntax directed translation, synthesized and inherited attributes.
CO-4	Ability to explain code optimization techniques and code generation techniques to improve the performance of a program in terms of speed & space

CLOUD COMPUTING (B17CS3206)
(Elective-I)

UNIT I

Systems modeling, Clustering and virtualization: Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency.

UNIT II

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT III

Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT IV

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT V

Hardware and Infrastructure: Clients, Security, Network, Services. Accessing the Cloud: Platforms, Web Applications, Web APIs, Web Browsers. Cloud Storage: Overview, Cloud Storage Providers.
Developing Applications: Google, Microsoft, Intuit Quick Base, Cast Iron Cloud, Bungee Connect, Development, Troubleshooting, Application Management.

Course Outcomes for Third Year Second Semester Course	
Course Code:B17 CS 3206	
Course Title: CLOUD COMPUTING	
CO-1	Define basic networking concepts for distributed and cloud computing. (K1).
CO-2	Understand the importance of Virtualization concept in cloud computing.(K2)
CO-3	Explain the architecture of Cloud platform. (K2)
CO-4	Make use of some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other cloud software environments. (K3)
CO-5	Utilize infrastructure, storage and tools to access the cloud to develop cloud application .(K3)

MOBILE COMPUTING (B17 CS 3207)
(Elective-I)

UNIT- I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT –II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT –III

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process &QoS Issues.

UNIT- V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.
Mobile Ad hoc Networks (MANETs) : Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3207	
Course Title: MOBILE COMPUTING (Elective-I)	
CO-1	A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities.
CO-2	The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
CO-3	A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.

CO-4	A student will be able to understand various protocols for mobile computing.
CO-5	A student will be able to understand various platforms for mobile computing.
CO-6	A student will be able to understand various routing algorithm.

SYLLABUS: DISTRIBUTED SYSTEMS (B17CS3208)
(Elective-I)

UNIT-I

Introduction to Distributed Systems, What is a Distributed System, Hard ware concepts, Software concepts, Design issues. Communication in Distributed Systems, Lay red Protocols, ATM networks, The Client – sever model, Remote Procedure call, Group communication.

UNIT-II

Synchronization in Distributed System, Clock Synchronization, Mutual Exclusion, Election algorithms, Atomic transactions, Deadlocks in Distributed Systems.

UNIT-III

Process and processors in Distributed System threads, System Models, Processors allocation, Scheduling in Distributed System, Fault tolerance, Real time Distributed System.

UNIT-IV

Distributed File Systems, Distributed File System Design, Distributed File System implementation, Trends in Distributed File System.

UNIT-V

Distributed Shared Memory, Introduction, What is Shared memory?, Consistency models, Page based Distributed Shared memory, Shared – variable Distributed Shared memory, Object based Distributed Shared Memory.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS3208	
Course Title: DISTRIBUTED SYSTEMS (Elective-I)	
CO-1	Scale as the number of entities in the system increase
CO-2	Can sustain failures and recover from them
CO-3	Work with distributed, fault tolerant file systems
CO-4	Can handle and process large data volumes
CO-5	Are secure and handle certain classes of distributed denial of service attacks
CO-6	Are Loosely coupled, transactional and eventually stable

INFORMATION RETRIEVAL SYSTEMS (B17CS3209)
(Elective-I)

UNIT - I

Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation.

Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms

UNIT- II

Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT- III

New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation asarrays.

UNIT- IV

Stemming Algorithms: Introduction, Types of Stemming Algorithms, ExperimentalEvaluations of Stemming to Compress Inverted Files

UNIT- V

Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction,Thesaurus construction from Texts, Merging existing Thesauri.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS3209	
Course Title: INFORMATION RETRIEVAL SYSTEMS (Elective-I)	
CO-1	Identify basic theories in information retrieval systems.
CO-2	Identify the analysis tools as they apply to information retrieval systems.
CO-3	Understands the problems solved in current IR systems.
CO-4	Describes the advantages of current IR systems.
CO-5	Understand the difficulty of representing and retrieving documents.
CO-6	Understand the latest technologies for linking, describing and searching the web.

SYLLABUS: SOFTWARE ENGINEERING MINI PROJECT LAB (B17 CS 3210)

The purpose of the Software Engineering Lab course is to familiarize the students with modern software engineering methods and tools, **Rational Products**. The course is realized as a project-like assignment that can, in principle, by a team of three/four students working full time. Typically the assignments have been completed during the semester by each projectteam.

The goal of the Software Engineering Project is to have a walk through from the requirements, design to implementing and testing. An emphasis is put on proper documentation. Term projects are projects that a group student might take through from initial specification to implementation by giving equal importance to both design and implementation.

Cycle I: Practicing UML diagrams using IBM Rational Rose. 6*3 periods= 18periods

Before developing a mini-project, in this cycle, the student is acquainted with different UML diagrams using Rational Rose. The experiments should include drawing UML diagrams listed below for two demo/example applications assigned by the lab Instructor. The input for the following experiments is problem statement for any two demo projects supplied by the instructor.

1. Introduction to Rational Rose and practicing the following diagrams
   - Activity diagrams for the overall business process of the projects
   - Use-case diagram for the demo projects along with Use-case descriptions and sub-diagrams for Use-cases.
2. Class diagram- Class diagrams including the features like classes, relationships, attributes and methods along with their visibilities.
3. Interaction diagrams- Sequence diagrams and Collaboration diagrams for different scenarios of the systems with all features like actors, objects and interactions.
4. Activity diagrams, State chart and other diagrams - Activity diagrams including the features like fork join and swim lanes. State diagrams including composite states and transitions. Component diagrams, Package diagrams and Deployment diagrams.
5. Forward and Reverser Engineering- Forward Engineering Class diagrams to classes in C++ and java

   and persistent classes to a database. Reverse Engineering C++ code, java code and a database.
6. Documentation using Rational Rose clear quest

Cycle II: Mini-Project 8*3 periods= 24periods

The project deliverables include

1. Problem statement
2. Requirements Analysis
3. Design

- A Software Design Description and a System Design.

- A test specification.

Implementation

1. Implement the assigned project with one of the following web technologies
2. Front end: Java technologies/PHP/MS.NET Technologies
3. Backend: Oracle/My-SQL/SQL-Server
4. Testing

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3211	
Course Title: NETWORK PROGRAMMING LAB	
CO-1	Students will be able to write Socket based Network application programs
CO-2	Students will be able to design and develop Client Server applications using Java.
CO-3	Students will be able to write network applications like One-One chat, Broad casting and Multicasting.
CO-4	Students will be able to understand e-mail programming (SMTP, POP).

SYLLABUS: NETWORK PROGRAMMING LAB (B17 CS 3211)

1. Write a program to identify well known ports on a Local/Remote System.

By trying to listen to the various well-known ports by opening client connections.
If the exception does not occur then the remote port is active else the remote port is inactive.

2. Write a program to implement Chat Application.
   i. One-One Chat: By opening socket connection and displaying what is written by one System to other.
   ii. Many-Many Chat (Broad Casting): Each Client opens a socket connection to the chat server and writes to the socket. Whatever is written by one system can be seen by all other systems.

3. Write a program to retrieve data from a remote database using Java.

   At the remote database a server listens for client connections. This server accepts SQL queries from the client, executes it on the database and sends the response to the client.

4. Write a program to implement Mail Client

- SMTP Client: Gives the server name, send email to the recipient using SMTP Commands
- POP Client: Gives the server name, user name and password, retrieve themails and allow manipulation of mailbox using POP commands.

5. Write a program to simulate Telnet Client which allows to connect to well-known serversand send and receive information.
   Provide a user interface to contact well known ports so that client server interaction can be seen by the user.

6. Write a program to implement IP multicasting.

7. Write a program to implement simple file transfer between two systems (without protocols)

   By opening socket connection to our server on one system and sending a file from onesystem to another

8. Write a program to implement TFTP Client and TFTP Server for file transfer

9. Write a program to implement HTTP-Server and HTTP Client.

The Server has to process the following commands: GET, POST, HEAD, and DELETE.The server must handle multiple clients.

1. Write a program to implement UDP Echo Server and UDP Echo Client.
2. Write a program to get the attributes and contents of a web page using URL Connectionclass.
3. Write a program to implement DNS.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 CS 3211	
Course Title: NETWORK PROGRAMMING LAB	
CO-1	Students will be able to write Socket based Network application programs
CO-2	Students will be able to design and develop Client Server applications using Java.
CO-3	Students will be able to write network applications like One-One chat, Broad casting and Multicasting.
CO-4	Students will be able to understand e-mail programming (SMTP, POP).

SYLLABUS: EMPLOYABILITY SKILLS (B17BS3201)
(Common to all Branches)

Part-A: Verbal Aptitude and Soft Skills-II

UNIT -I (VA)

Sentence Improvement (finding a substitute given under the sentence as alternatives), Sentence equivalence (completing a sentence by choosing two words either of which will fit in the blank), cloze test (reading the written discourse carefully and choosing the correct options from the alternatives and filling in the blanks), Summarizing and paraphrasing.

UNIT- II (VA)

Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the author’s intention ofwriting a passage), strategies for quick reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

UNIT- III (VA)

Punctuation, discourse markers, general Essay writing, writing Issues and Arguments (with emphasis on creativity and analysis of a topic), paragraph writing, preparing reports, framing a Statement of purpose Letters of Recommendation business letter writing, email writing, writing letters of complaints/responses. Picture perception and description, book review.

UNIT-IV (VA)

Just a minute sessions, reading news clippings in the class, extempore speech, telephone etiquette, making requests/suggestions/complaints, elocutions, debates, describing incidents and developing positive nonverbal communication, story narration, product description.

UNIT-V (SS)

Employability Skills – Significance — Transition from education to workplace - Preparing a road map for employment – Getting ready for the selection process, Awareness about Industry /Companies – Importance of researching your prospective workplace - Knowing about Selection process - Resume Preparation: Common resume blunders – tips, Resume Review, Group Discussion: Essential guidelines – Personal Interview: Reasons for Rejection and Selection.

Part-B: Quantitative Aptitude-II

UNIT I: Averages, mixtures and allegations, Data interpretation Understanding of AM, GM, HM-Problems on averages, Problems on mixtures standard method. Importance of data interpretation: Problems of data interpretation using line graphs, Problems of data interpretation using bar graphs, Problems of data interpretation using pie charts, Problems of data interpretation using others.

UNIT II: Puzzle test, blood Relations, permutations, Combinations and probability Importance of puzzle test, Various Blood relations-Notation to relations and sex making of family Tree diagram, Problems related to blood relations, Concept of permutation and combination, Problems on permutation, Problems on combinations, Problems involving both permutations and combinations, Concept of probability-Problems on

Coins, Problems on dice, Problems on cards, Problems on years.

UNIT III: Periods, Clocks, Calendars, Cubes and cuboids Deriving the formula to find the angle between hands for the given time, finding the time if the angle is known, Faulty clocks, History of calendar-Define year, leap year, Finding the day for the given date, Formula and method to find the day for the given date in easy way, Cuts to cubes, Colors to cubes, Cuts to cuboids, Colors to cuboids.

UNIT IV: Puzzles Selective puzzles from previous year placement papers, sitting arrangement, problems-circular arrangement, linear arrangement, different puzzles.

UNIT V: Geometry and Mensuration Introduction and use of geometry-Lines, Line segments, Types of angles, Intersecting lines, Parallel lines, Complementary angles, supplementary angles, Types of triangles-Problems on triangles, Types of quadrilaterals- Problems on quadrilaterals, Congruent triangles and properties, Similar triangles and its applications, Understanding about circles-Theorems on circles, Problems on circles, Tangents and circles, Importance of mensuration-Introduction of cylinder, cone, sphere, hemi sphere.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3201	
Course Title: EMPLOYABILITY SKILLS	
CO-1	1. Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	2. Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	3. Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).

CO-4	4. Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	5. Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.
	Part-B: Quantitative Aptitude-II
CO-6	1. The students will be able to perform well in calculating different types of data interpretation problems.
CO-7	2. The students will perform efficaciously on analytical and logical problems using various methods.
CO-8	3. Students will find the angle measurements of clock problems with the knowledge of calendars and clock
CO-9	4. The students will skillfully solve the puzzle problems like arrangement of different positions.
CO-10	5. The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on

SYLLABUS: COMPETITIVE CODING
(B17BS3204)

UNIT-I Introduction to Competitive Coding

Introduction to Competitive coding and coding Platforms. Coding solution Vs. Efficient Coding solution. Types of solution approaches. Analyzing problem specific data requirement, Various data representations. Essential Data structures for fast coding. Various Syntactical I/O techniques comparison. Numbers, operations (including exponentiation). Integerproperties (positive, negative, even, odd, divisible, prime, etc), Fractions, percentages and ratios.Point, vector, Cartesian coordinates (2D integer grid).

UNIT-II Essentials to Competitive coding

Basic data structures: Arrays, Strings, Stacks, Queues, Linked Lists. Asymptotic Notations – (Big-O),

Evaluating the runtime complexity – Space Complexity - Towers-of-Brahma – Standard Template Libraries - Square root functions, primality testing and related techniques. Euclidean algorithms. Recursion techniques. Organizing data in O (n log n). Binary search techniques. Red-Black Trees. Fenwick tree, Segment Tree.

Basic Techniques

Dynamic Arrays, Set structures, Map structures, Iterators and ranges, Generating Subsets, Generating permutations, Backtracking techniques, Pruning the search. Bit masking. Disjointset union.

UNIT-III Essential Coding Algorithms

Selection based algorithms: sorting, Coin change problem, Fractional selections, Schedules matching, Activity marking, heap sort, Huffman coding techniques, Spanning Trees, Minimizing sums, Data compression. Finding method count, Subsequence and related problems, paths in grid. DP with Bit mask

UNIT-IV String & Tree Algorithms

TRIE data structure, Naïve string searching, z-algorithm, Manacher's algorithm, Rabin-Karp, KMP Algorithm, Tree Traversals, Diameter, All longest paths, Binary trees, Applying search property to tree structures. Suffix arrays.

UNIT-V Graph Algorithms

Graph Algorithms – DFS, BFS. Depth First and Breadth First Traversals - Shortest paths: Dijkstra"s algorithm Bellman-Ford Algorithm – Floyd Warshall Algorithm - Adjacency List Representation – Euler path, tour , cycle – Eulerian Graph - Johnson"s Algorithm for All-pairs shortest path – Shortest path in Directed Acyclic Graph. Bridges and articulation points.Topological sorting, strongly connected components in directed graphs. 2-SAT.

Note: Introduce C++ STL/Java Collections and let students solve problems using C++ STL/Java Collections

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3204	
Course Title: COMPETITIVE CODING	
CO-1	Acquire coding knowledge on essential of competitive coding
CO-2	Acquire Programming knowledge on time & space complexities
CO-3	Acquire coding knowledge on dynamic Arrays, Set & Map structures and sorting
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on String, Tree, Graph Theory algorithms

SYLLABUS: IPR & PATENTS (B17BS3206)
(Common to CSE, ECE & IT)

UNIT I

Intellectual Property Law: Basics - Types of Intellectual Property - Innovations and Inventions - Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Compliance and Liability Issues

UNIT II

Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership– Copyright Formalities and Registration – Limitations – Infringement of Copyright - Plagiarism and difference between Copyright infringement and Plagiarism

UNIT III

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT IV

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Course Outcomes for Third Year Second Semester Course	
Course Code:B17BS3206	
Course Title: IPR& PATENTS	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

ELECTRONICS AND COMMUNICATIONS ENGINEERING

Regulation: R17			I/ IV - B.Tech. I- Semester						
ELECTRONICS &COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Course Code	**Course Name**	**Category**	**Cr.**	**L**	**T**	**P**	**Int. Marks**	**Ext. Marks**	**Total Marks**
B17 BS1101	English – I	BS	3	3	1	--	30	70	100
B17 BS1102	Mathematics – I	BS	3	3	1	--	30	70	100
B17 BS1103	Mathematics-II	BS	3	3	1	--	30	70	100
B17 BS1104	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS1101	Computer ProgrammingUsing C	ES	3	3	1	--	30	70	100
B17 CE1101	Environmental Studies	ES	2	2	1	--	30	70	100
B17 BS1106	Engineering Physics Lab	BS	2	--	--	3	50	50	100
B17 BS1108	English CommunicationSkills Lab – I	BS	2	--	--	3	50	50	100
# DL1	Department Lab	ES	2	--	--	3	50	50	100
B17 BS1110	Engineering Physics Virtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS1112	NCC	BS	--	--	--	2	--	--	--
Total			**23**	**17**	**6**	**13**	**330**	**570**	**900**

#DL 1	CSE & IT	B17 CS 1102	C Programming Lab & Hardware Fundamentals
	ECE	B17 CS 1103	C Programming Lab

ELECTRONICS &COMMNICATION ENGINEERING

SYLLABUS: ENGLISH – I (B17 BS 1101)

(Common to all Branches)

Life through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I

People and Places:-Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types-Describing people, places and events-Writing sentences-Self-awareness- Self-motivation, Dialogue writing.

UNIT-II

Personality and Lifestyle: - Word quiz – Verbs-Adverbs-Negotiations-Proving yourself- Meeting Carl Jung-Describing yourself- Living in the 21st century- Using your dictionary- Communication-Adaptability.

UNIT-III

Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User's Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue-Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

UNIT-IV

Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewingemployees- Your first interview-Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V

Work and Business:- A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The InsideStory,* Mark Zuckerberg: World"s Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business- Recession-Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS – I (B17 BS 1102)
(Common to all Branches)

UNIT I: Differential equations of first order and first degree:

Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Newton"s Law of cooling, Law of natural growth and decay, Orthogonal trajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, xV(x), Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:

Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplacetransforms.

UNIT IV: Partial differentiation:

Introduction, Homogeneous functions, Euler's theorem, Total derivative, Chain rule, whichvariable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign.

Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange's method (with constraints)

UNIT V: First order and higher order partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit"s method). Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type e^{ax+by}, sin (ax+by), cos (ax+by), $x^m y^n$.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jocobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

SYLLABUS: MATHEMATICS – II

(B17 BS 1103)

(Common to CSE, ECE& IT)

`UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backwarddifferences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton‟s formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule, Simpson‟s $1/3^{rd}$ and $3/8^{th}$ rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second Order and fourth order).

UNIT IV: Fourier series:

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet‟s conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval‟sformula.

UNIT V: Fourier Transforms:

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval‟s identities, Finite Fourier transforms.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1103	
Course Title: MATHEMATICS – II	
CO-1	Find a real root of algebraic and transcendental equations using different methods.
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms, Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: ENGINEERING PHYSICS (B17 BS 1104)
(Common to CSE, ECE& IT)

UNIT I: Interference and Diffraction

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton‟s rings-Michelson‟s interferometer. Fraunhoffer‟s diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers

Introduction, Spontaneous emission and Stimulated emission – Einstein‟s relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle- Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

UNIT- III: Electro Magnetic Fields and Ultrasonics

Concept of Electromagnetic induction , Faraday‟s law, Lenz‟s law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere‟s law, Maxwell‟s equations and their significance (withoutderivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function- significance-Schrodinger‟s time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative) - Energy bands ofcrystalline solids-Distinction between Conductors, Semiconductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC, FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg‟s law.

Introduction to Nano materials – Synthesis methods: Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

(Note: Assignment Marks of Engineering Physics are to be considered from the internal marks of Engineering Physics-- Virtual Labs – Assignments B17 BS 1110)

Course Outcomes for First Year First Semester Course	
Course Code:B17 BS 1104	
Course Title: ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonic as a tool for technological applications.
CO-4	Learn the behaviour of particles at the very microscopic level by using wave nature of particles and understand the behaviour of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C (B17 CS 1101)
(Common to CSE, ECE & IT)

UNIT I:

Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts.

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high level languages, Creating and Running Programs: Writing, Editing (vi/emacs editor), Compiling (gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators,conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking thesymmetricity of a Matrix. STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation

POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:

Objective: Understanding miscellaneous aspects of C

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration,definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, type def, bit-fields, program applications

Course Outcomes for First Year First Semester Course	
Course Code:B17 CS 1101	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming.
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference.
CO-6	Understand the dynamics of memory by the use of pointers
CO-7	Use different data structures and create/update basic data files.

SYLLABUS: ENVIRONMENTAL STUDIES (B17 CE 1101)

(Common to all Branches)

UNIT – I

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. GlobalEnvironmental Crisis

Ecosystems:

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers andDecomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems DesertEcosystems and Aquatic Ecosystems

UNIT-II

Biodiversity:

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservationof Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

UNIT-III

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture. Forest Resources: Use and over exploitation-Mining and Dams-their effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. Energy Resources: Renewable and non-renewable energy sources, use of alternate energysources-impact of energy use on environment.

UNIT-IV

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India:

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

UNIT-V

Institutions and Governance:

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants

Course Outcomes for First Year First Semester Course	
Course Code:B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

SYLLABUS: ENGINEERING PHYSICS LAB
(B17 BS 1106)

(Common to CSE, ECE& IT)

LIST OF EXPERIMENTS
(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton‟s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde‟s experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee‟s apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young‟s modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck‟s constant using photocell.

Determination of surface tension of liquid by capillary rise method

Course Outcomes for First Year First Semester Course	
Course Code:B17 BS 1106	
Course Title: ENGINEERING PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the instruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

ENGLISH COMMUNICATIONSKILS LAB- I(B17 BS 1108)

(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

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Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS

(B17 CS 1102)

(Common to CSE & IT)

List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is

   a. Prime Number
   b. Armstrong Number

b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide

Using switch case

b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions - Continued

a) Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise – 8
Arrays
Demonstration of arrays

a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure
b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

c) Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.

i) copy

ii) concatenate

iii) length

iv) compare

b) Implementation of string manipulation operations **without** library function.

a) copy

b) concatenate

c) length

d) compare

Exercise – 13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Exercise - 15

a) System Assembling, Disassembling and identification of Parts/Peripherals.

b) Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.

Exercise - 16

a) MS-Office / Open Office

i. Word - Formatting, Page Borders, Reviewing, Equations, symbols

ii. Spread Sheet-Organize data, usage of formula, graphs, charts.

iii. PowerPoint - features of power point, guidelines for preparing an effective presentation.

b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewall Settings. Installing application software, system software & tools.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)

b) The Lab record must be a print of the LATEX (.tex) Format.

SYLLABUS: C PROGRAMMING LAB (B17CS 1103)
(For ECE)

Programming

Exercise - 1 **Basics**

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is
   i. Prime Number
   ii. Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returningvalues.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or DivideUsing switch…case
b) Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

a) Write a C Program to compute the values of sin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise-8
Arrays

Demonstration of arrays

a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure
b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs.

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.
   i) copy
   ii) concatenate
   iii) length
   iv) compare
b) Implementation of string manipulation operations **without** library function.
   i) Copy

ii) Concatenate

iii) Length

iv) Compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

SYLLABUS: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS

(Common to CSE, ECE & IT)

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster‟s angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson‟s interferometer
13. Black body radiation

URL: www.vlab.co.in

(Note: Internal Marks of Engineering Physics - Virtual Labs – Assignments are to be considered as Assignment marks in the Internal Marks of Engineering Physics- B17 BS 1104)

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1110	
Course Title: ENGINEERING PHYSICS - VIRTUAL LABS-ASSIGNMENTS	
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

SYLLABUS: NCC (B17BS1112)
(Common to all branches)

The NCC- National Integration and Awareness- Drill- Personality Development Life Skills-Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

(Note: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17				I/ IV - B.Tech. II- Semester					
ELECTRONICS& COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS1201	English – II	BS	3	3	1	--	30	70	100
B17 BS1203	Mathematics – III	BS	3	3	1	--	30	70	100
B17 BS1205	Engineering Chemistry	BS	3	3	1	--	30	70	100
B17 ME1201	Engineering Drawing	ES	3	1	--	3	30	70	100
# DS 2	Department Subject	ES	3	3	1	--	30	70	100
# DS 3	Department Subject	ES	3	3	1	--	30	70	100
B17 BS1207	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100
B17 BS1208	English CommunicationSkills Lab – II	BS	2	--	--	3	50	50	100
# DL2	Department Lab	ES	2	--	--	3	50	50	100
B17 BS1212	Inner Engineering	BS	--	--	--	2	--	--	--
Total			**24**	**16**	**5**	**14**	**330**	**570**	**900**

# DS 2	CSE & IT	B17 CS 1202	Object Oriented Programming Through C++
	ECE	B17 CS 1203	Data Structures
#DS 3	CSE & IT	B17 EC 1201	Elements of Electronics Engineering
	ECE	B17 EE 1203	Elements of Electrical Engineering
#DL2	CSE & IT	B17 CS 1205	Object Oriented Programming Lab
	ECE	B17 BS 1209	Engineering Workshop & IT Workshop

SYLLABUS: ENGLISH – II (B17 BS 1201)

(Common to all Branches)

UNIT I:

A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'

B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

UNIT II:

A. Detailed-Text: Unit 2: ' A Dilemma'

B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

UNIT III:

A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments

B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

UNIT IV:

A. Detailed-Text: Unit 4: 'The Lottery'

B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

UNIT V:

A. Detailed-Text: Unit 5: ' The Chief Software Architect'

B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS: MATHEMATICS – III (B17 BS 1203)
(Common to all Branches)

UNIT I: Linear systems of equations:

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.

Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.

Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.

Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

UNIT IV: Vector Differentiation:

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related Problems.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green‟s, Stokes‟ and Gauss divergence theorems.

SYLLABUS::ENGINEERING CHEMISTRY (B17 BS 1205)

(Common to CSE, ECE & IT)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications ofPolyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiberreinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination ofCalorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufactureof coke by Otto – Hoffmann"s by-product coke oven process; Refining of Petroleum, Knocking-octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG , CNG. Lubricants: - Definition, Mechanism of Lubrication, Properties of Lubricants (Definition andsignificance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors

Influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings
– Galvanizing, Tinning, Electroplating; Electrroless plating; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials

Cement: - Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refactories.Solar Energy: -

Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi-Conductors, Classification and chemistry of semiconductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1205	
Course Title: ENGINEERING CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: ENGINEERING DRAWING (B17 ME 1201)

(Common to CSE, ECE & IT)

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

UNIT III

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views toisometric views.

Course Outcomes for First Year Second Semester Course	
Course Code:B17 ME 1201	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

SYLLABUS: OBJECT-ORIENTED PROGRAMMING THROUGH C++ (B17 CS 1202)
(Common to CSE & IT)

UNIT-I: Introduction to C++, Classes and Objects.

Difference between C and C++, Disadvantage of Conventional Programming, Basic Conceptsof Object Oriented Programming, Advantage of OOP, Object Oriented Languages, Functions in C++, Operators in C++. Classes and Objects: Declaring Objects, Access Specifiers and their Scope, Static data members, static member functions, arrays of objects, local classes, Nested classes.

UNIT-II: Constructors, Destructors and Operator Overloading.

Constructors and Destructors: Introduction- Constructors and Destructor- types of constructors, Constructors with default Arguments, Dynamic initialization of objects, Dynamic constructors. Operator Overloading Introduction, Overloading Unary Operators and Binary Operators, Overloading Unary Operators and Binary Operators using friend function, Overloading Assignment Operator (=), Overloading insertion(<<) and extraction(>>) operators, Manipulation of Strings using Operators, Rules for Overloading Operators, Type Conversions.

UNIT-III: Inheritance, Pointers, Virtual Functions and Polymorphism.

Inheritance: Reusability, Types of Inheritance, Virtual Base Classes, Abstract Classes, Advantages of Inheritance, Disadvantages of Inheritance, and constructors in derived classes. Pointers Introduction: Pointers to Objects, "this" Pointer, Pointers to Derived Classes, including Polymorphisms and Virtual Functions, Rules for Virtual Functions, pure virtual functions.

UNIT-IV: Manipulating Strings, Managing console I/O operations and Exception Handling.

Strings: Creating String Objects, Manipulating String Objects, Relational operations, String Characteristics, Accessing Characters in Strings. C++ Stream Classes, Unformatted I/O operations, Formatted I/O operations, managing output with Manipulators, Exception Handling: Principles of Exception Handling, Exception Handling Mechanism, throwing and catching Mechanism.

UNIT-V: Generic Programming with Templates, Standard Template Library and Files. Generic Programming with Templates, Need for Templates, Definition of class Templates,Normal Function Templates, Over Loading of Template Function-Bubble Sort Using FunctionTemplates, Difference between Templates and Macros, Overview of Standard TemplateLibrary, STL Programming Model, Containers, Algorithms, Iterators, Vectors, Lists, Maps.FILES: Introduction, File Stream Classes, File Operations, File Pointers and Manipulators, SequentialAccess Files, Random File Access Operation, Detecting End-of File, Command-Line Arguments.

SYLLABUS: DATA STRUCTURES (B17 CS 1203)
(For ECE)

UNIT-I

Arrays and Structures

Array as an Abstract Data Type, Polynomial Abstract Data Type, Introduction to Sparse Matrix, Sparse Matrix Abstract Data Type, Representation of Multidimensional Arrays, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures.

Recursion, Simple Searching and Sorting Techniques

Recursive functions, Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Introduction to Merge Sort, Iterative Merge Sort, Recursive Merge Sort, Heap sort.

UNIT-II

Stacks and Queues

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, , Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Multiple Stacks and Queues, Circular Queues using arrays.

UNIT-III

Linked Lists

Pointers, Dynamically Allocated Storage using pointers, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Additional List Operations, Operations for Singly Linked Lists, Operations for Doubly Linked Lists, RadixSort.

UNIT-IV

Trees

Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Priority Queues, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree, Counting Binary Trees.

UNIT-V

Graphs

Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim"s and Kruskal‟s Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination - Dijkstra‟s Algorithm, All Pairs Shortest Paths - Floyd‟s Algorithm, Transitive Closure using Warshall‟s Algorithm.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1203	
Course Title: DATA STRUCTURES	
CO-1	Apply advanced data structure strategies for exploring complex data structures.
CO-2	Compare and contrast various data structures and design techniques in the area of Performance.
CO-3	Implement all data structures like stacks, queues, trees, lists and graphs and compare their performance and trade-offs.
CO-4	Implement different operations on trees.
CO-5	Apply graphs to real time applications.
CO-6	Perform sorting using different algorithms.

SYLLABUS: ELEMENTS OF ELECTRONICS ENGINEERING (B17 EC 1201)

(Common to CSE & IT)

UNIT I: Semiconductors and P-N junction diode:

Intrinsic and extrinsic semiconductors, charge densities in semiconductors, Drift and Diffusion currents, Hall Effect, Mass action law. Basic operation and V-I Characteristics of semiconductor diode, Diode current equation, Avalanche breakdown and Zener breakdown phenomenon.

UNIT II: Special Diodes and Diode Rectifiers:

Zener Diode, LED, Photo Diode and tunnel diode, half wave and Full wave Rectifiers- with andwithout filters, Bridge Rectifier, Expressions - Ripple factor, Efficiency, Capacitor filters

.

UNIT III: Bipolar Junction Transistor:

Introduction, construction, basic operation of npn and pnp transistors, Transistor circuit configurations- CE, CB, CC- Input and output Characteristics in various configurations. h- Parameter model for transistor amplifier. (Introductory Treatment only).

UNIT IV: Transistor Biasing and Thermal Stabilization:

Transistor Biasing, Thermal runaway, stabilization, Different methods of Biasing-Fixed Bias, collector feedback bias, self-bias, Bias compensation.

UNIT V: Field Effect Transistors: Junction field Effect Transistors (JFET) - JFET characteristics, JFET Parameters, Small Signal model of FET, Depletion and Enhancement type MOSFET"s.

ELEMENTS OF ELECTRICAL ENGINEERING (B17 EE 1203)
(For ECE)

UNIT I: Electrical and Magnetic Circuits:

Basic definitions, Types of network elements, Ohm"s Law, Kirchhoff"s Laws, Series and parallelCircuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday"s laws, Lenz"s law, statically induced EMF, dynamically induced EMF.

UNIT – II: DC Machines:

Principle of operation of DC Generator - EMF equation – Construction-Types of DC generator- OCC of DC Generator-DC motor types - Torque equation –Losses-Efficiency-speed control methods- applications

UNIT – III: Transformers:

Principle of operation of single phase transformer - EMF equation - equivalent circuit –losses - efficiency and regulation- Open circuit and Short circuit tests.

UNIT – IV: Induction Motors:

Construction-Principle of operation of induction motor-slip- rotor frequency, slip - torque characteristics - Power flow diagram-Efficiency-Applications

UNIT – V: Synchronous Generator and Measuring Instruments:

Construction-Principle of operation of alternator-EMF equation of alternator- Regulation bySynchronous impedance method.

Classification –Deflecting, controlling, damping Torque, ammeter, voltmeter, wattmeter, MI, MC instruments-Energy meter

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1203	
Course Title: ELEMENTS OF ELECTRICAL ENGINEERING	
CO-1	Able to understand the basics of Magnetic Circuits and Kirchhoff's laws.
CO-2	Able to understand the operation of DC Machines and to conduct different Tests
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motor.
CO-5	Able to explain the operation of three phase induction motor.

SYLLABUS: ENGINEERING CHEMISTRY LAB (B17 BS 1207)

(Common to CSE, ECE& IT)

List of Experiments

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by $KMnO_4$.
4. Estimation of oxalic acid by $KMnO_4$
5. Estimation of Mohr"s salt by $K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler"s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1207	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

ENGLISH COMMUNICATION SKILS LAB- II (B17 BS 1208)
(Common to All Branches)

1. Debating & Practice.
2. Group Discussions & Practice.
3. Presentation Skills & Practice
4. Interview Skills & Practice
5. Email
6. Curriculum Vitae & Practice
7. Idiomatic Expressions
8. Common Errors in English & Practice

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: OBJECT ORIENTED PROGRAMMING LAB (B17 CS 1205)
(Common to CSE & IT)

LIST OF PROGRAMS

1. Write a Programme that computes the simple interest and compound interest payable on principal amount (in Rs.) of loan borrowed by the customer from a bank for a giver period of time (in years) at specific rate of interest. Further determine whether the b bank will benefit by charging simple interest or compound interest
2. Write a Programme to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to thepassenger according to following criteria.
3. Write a C++ Program to illustrate Enumeration and Function Overloading
4. Write a C++ Program to illustrate Scope and Storage class
5. Implementation of ADT such as Stack and Queues
6. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
7. Write a Program to illustrate Static member and methods
8. Write a Program to illustrate Bit fields
9. Write a Program to overload as binary operator, friend and member function
10. Write a Program to overload unary operator in Postfix and Prefix form as member and friendfunction
11. Write a C++ Program to illustrate Iterators and Containers
12. Write a C++ Program to illustrate function templates
13. Write a C++ Program to illustrate template class
14. Write C++ Programs and incorporating various forms of Inheritance
15. Write a C++ Program to illustrate Virtual functions
16. To write a C++ program to find the sum for the given variables using function with default arguments.
17. To write a C++ program to find the value of a number raised to its power that demonstrates afunction using call by value.
18. To write a C++ program and to implement the concept of Call by Address
19. To write a program in C++ to prepare a student Record using class and object
20. To implement the concept of unary operator overloading by creating a C++ program.
21. Write a C++ program for swapping two values using function templates
22. Write a C++ program to implement a file handling concept using sequential access.

SYLLABUS: ENGINEERING WORKSHOP & IT WORKSHOP (B17 BS 1209)

(For ECE)

PART-A ENGINEERING WORKSHOP

Carpentry	**Fitting**
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

Note: At least two exercises to be done from each trade.

PART B: IT WORKSHOP:

LIST OF EXCERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.
3. MS-Office / Open Office
   a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
   b) Spread Sheet - organize data, usage of formula, graphs, charts.
   c) Power point - features of power point, guidelines for preparing an effective presentation.
   d) Access- creation of database, validate data.

4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system

software & tools.

5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette,cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1209	
Course Title: ENGINEERING WORKSHOP & IT WORKSHOP	
CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.

SYLLABUS: INNER ENGINEERING (B17 BS 1212)
(Common to CSE, ECE & IT)

Unit-I

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in thepresent Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.,

Unit-II

YES!+ Workshop:

Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management – Happiness point – Opposite Values – Pranayama – Sudarshan kriya

Unit-III

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life –Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

Unit-IV

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

Unit -V

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – PublicSpeaking – Art of Teaching.

(**Note**: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1212	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Regulation: R17				II/ IV - B.Tech. I- Semester					
ELECTRONICS &COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS2101	Mathematics - IV	BS	3	3	1	--	30	70	100
B17 EC2101	Electronic Devices andCircuits	ES	3	3	1	--	30	70	100
B17 EC2102	Switching Theory andLogic Design	ES	3	3	1	--	30	70	100
B17 EC2103	Signals and Systems	ES	3	3	1	--	30	70	100
B17 EE2104	Network Analysis	ES	3	3	1	--	30	70	100
B17 EC2104	Probability Theory andrandom Processes	ES	3	3	1	--	30	70	100
B17 EC2107	Electronic Devices andCircuits Lab	ES	2	--	--	3	50	50	100
B17 EE2106	Networks and Electrical Technology Lab	ES	2	--	--	3	50	50	100
B17 BS 2106	Programming Skills-I	BS	1	--	--	2	50	---	50
B17 BS2107	English Proficiency-I	BS	--	1	1	--	--	--	--
Total			**23**	**19**	**7**	**8**	**330**	**520**	**850**

SYLLABUS: MATHEMATICS IV
(B17BS2101)
(Common to CE, ECE, EEE& ME)

UNIT-I Functions of a Complex Variable

Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n, e^z, sin z, sinh z and log z (no questions may be set).

Limit and continuity of a function of the complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, finding an analytic function, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: the transformations defined by $w = z+c$, $w = cz$, $w = 1/z$, the Bilinear transformation, $w = z^2$ and $w=e^z$.

UNIT-II Applications of Partial Differential Equations

Method of separation of variables, One –dimensional wave equation, the D‟Alembert‟s solution, one-dimensional heat equation, two-dimensional heat flow in steady state (solution of two- dimensional Laplace equation in Cartesian coordinates only)

UNIT-III Difference Equations And Z-Transforms

Formation of a difference equation, Rules for finding complimentary function and particular integral for linear difference equations.

Definition of Z- transform, some standard Z- transforms, properties, transform of a function multiplied by n, initial value theorem and final value theorem(without proof), evaluation of inverse Z- transforms, convolution theorem (without proof), solution of linear difference equations by the use of Z- transforms.

UNIT-IV Probability Distributions

Binomial distribution, Poisson distribution, Normal distribution: Definition (pmf/pdf), notation, mean, variance, moment generating function, probability generating function and fitting of a distribution.

UNIT-V Sampling Theory

Sampling theory: Sampling distribution, standard error, testing of Hypothesis, level of significance, confidence limits, simple sampling of attributes, sampling of variables, estimation of mean and variance.

Large samples: testing of hypothesis for sample proportion, two proportions, single mean and two means.

Small samples: Degrees of freedom, Students‟ t- distribution, t-test for single mean, two means; Chi-squared distribution-testing the goodness of a fit.

Course Outcomes for Second Year First Semester Course	
Course Code: B17BS2101	
Course Title: MATHEMATICS IV	
CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.

SYLLABUS: ELECTRONIC DEVICES AND CIRCUITS (B17 EC 2101)
(Common to ECE & EEE)

UNIT-I: Transport Phenomena in Semi-Conductors

Mobility and conductivity, intrinsic and extrinsic semiconductors, mass action law, charge densities in a semiconductors, Hall Effect, generation and recombination of charges, drift and diffusion currents, the continuity equation, injected minority carrier charge, potential variation in graded semiconductors.

UNIT- II: PN junction diode and Diode Rectifiers

Open circuited PN junction , PN junction as a rectifier, current components in a PN diode, V-I characteristics and its temperature dependence, transition capacitance, charge control description of a diode, diffusion capacitance, junction diode switching times, Zener diode, Tunnel Diode, Photo diode,Varactor diode, LED,Half wave, Full wave and Bridge Rectifiers with and without filters, Ripple factor and regulation characteristics

UNIT – III: Bipolar junction transistors

Introduction to BJT, operation of a transistor and transistor biasing for different operatingconditions, transistor current components, transistor amplification factors: α,β,γ relation between α and β,γ early effect or base-width modulation, common base configuration and its input and output characteristics, common emitter configuration and its input and output characteristics, common collector configuration and its input and output characteristics, Comparison of CE, CB and CC Configurations, Break- down in transistors, Photo Transistor.

Transistor Biasing Circuits: The operating point, Bias stability, different types of biasing techniques, stabilization against variation in I_{co} , $V_{BE,}$ & β. Bias compensation, thermal runaway,thermal stability.

UNIT – IV: Field Effect transistors

JFET and its characteristics, pinch off voltage, FET small signal model, MOSFET and itscharacteristics, Biasing of FETs.

UNIT – V: Transistors at low and high frequencies

Transistor hybrid model, H-parameters, Analysis of transistor amplifier circuits using h- parameters, comparison of transistor amplifier configurations, analysis of single stage amplifier, effects of bypass and coupling capacitors, frequency response of CE amplifier, Emitter follower, High frequency model of transistor.

Course Outcomes for Second Year First Semester Course	
Course Code: B17EC2101	
Course Title: ELECTRONIC DEVICES AND CIRCUITS	
CO-1	Understand the physical structure, principles of operation, electrical characteristics and circuit models of diodes, BJ's and FE's.
CO-2	Use the concepts of semiconductor physics and electronic devices to design and fabricate simple electronic circuits.
CO-3	Use this knowledge to analyze and design amplifier circuits and oscillator circuits to be used in various applications.
CO-4	Extend the understanding of how electronic circuits and their functions fit into larger electronic systems.

SYLLABUS: SWITCHING THEORY AND LOGIC DESIGN (B17 EC 2102)

UNIT-I-Number Systems, Codes and Boolean algebra:

Number Systems, Base Conversion Methods, Complements of Numbers, 4 Bit Codes-BCD, Excess-3, 2421, 8421 codes. Even and Odd parity, Hamming code, Error detecting and Error correcting codes.

Fundamentals of Boolean Algebra and Logic Gates – AND, OR, NOT, NAND, NOR and XOR. Boolean theorems and proofs.

UNIT-II- Boolean Functions and Minimization:

Boolean SOP and POS functions-Canonical and Standard. Realization with Universal Gates– Simplification of Boolean functions using Karnaugh Map (up to 6 variables) and Quine McClusky methods.

UNIT-III-Combinational Logic Circuits and Design:

Logic Design of Combinational circuits – Binary Addition, Subtraction, Multiplexers, De multiplexers, Decoders, Encoders, Code Conversion, Priority Encoders, Seven – segment Displays, Comparators and PLDs.

UNIT-IV-Sequential Logic Circuits and Design:

The Flip-flops: SR, RS and JK Flip-Flops, Race around problem, MSJK, T and D-Flip-flops.Flip Flops with preset and clear inputs. Excitation tables of all Flip- Flops and conversions from one type to another. Design of Shift Registers with SIPO, SISO, PIPO and PISO modes and universal shift register. Ring counter and Johnson counter.

UNIT-V- Asynchronous and Synchronous Sequential Circuits:

Design of Asynchronous counters for any modulous. Design of Synchronous counters using SR, JK, T and D-FFs. Basics of Asynchronous Sequential Circuits, Cycles, Races and Hazards. Analysis and Design of Synchronous Sequential Circuits with State Diagrams and State Reduction.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EC 2102	
Course Title: SWITCHING THEORY AND LOGIC DESIGN	
CO-1	Understand various basic number systems, codes and basic logic gates.
CO-2	Learn various types of Boolean expressions and theorems and simplifications using K-map and Tabulation methods.
CO-3	Design and analyze combinational circuits using logic gates.
CO-4	Understand basics of Flip-flops, design and analyze sequential circuits using those Flip-flops and gates.
CO-5	Design of all types of counters and understand basics of Synchronous and Asynchronous sequential circuits, and analyze them.

SYLLABUS: SIGNALS AND SYSTEMS (B17 EC 2103)

UNIT-I : Introduction to Continuous –Time and Discrete –Time signals and systems Continuous –Time and Discrete –Time signals, Signal Energy and Power, Periodic Signals, Evenand odd Signals, continuous-Time complex Exponential and Sinusoidal Signals, Discrete –Timecomplex Exponential and Sinusoidal Signals and their Periodicity , The Unit Impulse and Unitstep Functions, The Continuous-Time Unit impulse and Unit step Sequence, Continuous –Timeand Discrete –Time Systems, Interconnections of Systems, Basic System Properties, Continuous
–Time and Discrete Time LTI Systems: – The Graphical interpretation of Convolution Integral and The Convolution Sum, Casual LTI Systems Described by Differential and Difference Equations, Singularity Functions.

UNIT-II: fourier series Representation of Periodic Signals

Introduction, Fourier Series Representation of continuous time Periodic Signals(Complex Exponential and Trigonometric Fourier Series only),convergence of the Fourier Series, Properties of continuous time Fourier Series, Fourier Series representation of discrete timeperiodic signals, Properties of discrete time Fourier Series (Elementary Level on DTFS).

UNIT-III: Continuous and Discrete time Fourier Transform

Introduction, Representation of Aperiodic signals, The continuous time Fourier Transform, The Fourier Transform for periodic signals, Properties of the continuous time Fourier Transform, Systems characterized by linear constant-coefficient differential equations. Discrete time Fourier Transform, Properties of the discrete time Fourier Transform, Systems characterized by linear constant co-efficient differential equations (Elementary Level on DTFT).

UNIT-IV: Laplace Transform

Introduction, The Laplace Transform, the region of convergence for Laplace Transforms, The Inverse Laplace Transform, Properties of Laplace Transforms, The initial and Final value theorems, Analysis and characterization of LTI systems using the Laplace Transforms.

UNIT-V: Sampling Theorem and Z-transform

Introduction to Sampling Theorem, Statement of Sampling Theorem for Low pass and Band pass signals(Theorem Proof for Low Pass signals only) ,reconstruction of a signal from its samples using interpolation, discussion on Oversampling, Critical sampling and Under sampling(aliasing). The Z-Transform(Bilateral and unilateral), The Inverse Z-Transform, Properties of Z-Transform, Initial and Final Value theorems, some common Z-transform pairs, Analysis and characterization of LTI systems using the Z-Transforms.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EC 2103	
Course Title: SIGNALS AND SYSTEMS	
CO-1	Understand the basic concepts of signals and systems.
CO-2	Analyze the spectral characteristics of Continuous Time and Discrete Time periodic and aperiodic signals using Fourier analysis.
CO-3	Analyze system properties based on impulse response and Fourier analysis.
CO-4	Apply Laplace- transforms for analyzing Continuous -time signals and systems.
CO-5	Apply Z- transforms for analyzing discrete-time signals and systems.
CO-6	Understand the process of sampling and the effects of under sampling.

SYLLABUS: NETWORK ANALYSIS (B17 EE 2104)

UNIT-I: Analysis of DC Circuits:

Network elements classification, series and parallel combination of Resistance, Inductance and Capacitance. Star to delta transformation. Types of sources, Source transformation, Mesh analysis and Nodal analysis problem solving with resistances only including dependent sources.

UNIT-II: DC transients:

Inductor, Capacitor, source free RL, RC and RLC response, Evaluation of Initial conditions, Application of unit-step function to RL, RC and RLC circuits, concepts of Natural, Forced and Complete response.

UNIT-III: Steady State Analysis of A.C Circuits:

Average and Effective value of Voltage and Current, Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C Problem solving using mesh and nodal analysis, Instantaneous and Average Power, Complex Power.

UNIT-IV: Network Theorems:

Thevenin"s, Norton"s, Milliman"s, Reciprocity, Superposition, Max Power Transfer, Tellegens theorems-problem solving using dependent sources also.

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, , Bandwidth of parallel resonance,general case resistance present in both branches.

UNIT-V: Two-port networks:

Relationship of two port networks, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Inverse h-parameters, Inverse Transmission line parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascading of two port networks, series connection of two port networks, concept of duality, problem solving including dependent sources .

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EE 2104	
Course Title: NETWORK ANALYSIS	
CO-1	Gain the knowledge on basic network elements and learn various circuits analyzing techniques
CO-2	Will learn the behavior of energy storing elements (Inductance & Capacitance) in circuits and analyses transient and steady state responses.
CO-3	Will analyze the RLC circuit behavior in detailed.
CO-4	Analyze the performance of periodic waveforms.
CO-5	Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g).

SYLLABUS: PROBABILITY THEORY & RANDOM PROCESSES (B17 EC 2104)

UNIT-I Probability Theory

Definitions of Probability, Axioms of Probability, Probability Spaces, Properties of Probabilities,Joint and Conditional Probabilities, Independent Events

UNIT-II Random Variables

Probability Distribution Function, Probability Density Function, Joint Distribution of Two Variables, Conditional Probability Distribution and Density, Independent Random Variables, Normal Distribution, Cauchy‟s distribution, Exponential Distribution, Binomial Distribution, Poisson distribution, Functions of Random Variables.

UNIT-III Statistical Averages

Random Vectors, Statistical Averages, Characteristic Function of Random Variables, Inequalities of Chebyshev‟s and Schwartz, Convergence Concepts, Central Limit Theorem.

UNIT-IV Random Processes

Introduction, Definitions, Stationarity, Ergodicity, Covariance Function and their Properties, Spectral Representation, Weiner-Kinchine Theorem.

UNIT-V Linear Systems and Random Noise Processes

Classification of Linear systems, Response of Linear Systems to Random signals, Spectralcharacteristics of system Response, Gaussian processes, Poisson Processes, Low-pass and Band- pass Noise Representation.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EC 2104	
Course Title: PROBABILITY THEORY & RANDOM PROCESSES	
CO-1	Understand the axiomatic formulation of modern probability theory.
CO-2	Characterize Probability Models and functions of Random variables based on single and multiple random variables.
CO-3	Evaluate and apply moments and characteristic functions and understand the concept of Inequalities and probabilistic limits.
CO-4	Understand the concept of Random process and determine covariance and spectral density of stationary random processes.
CO-5	Demonstrate the specific applications to Poisson and Gaussian process and representation of low pass and band pass noise models, Analyze the response of random inputs to linear time invariant systems.

SYLLABUS: ELECTRONICS DEVICES AND CIRCUITS LAB (B17 EC 2107)

(Common to ECE & EEE)

ELECTRONIC WORKSHOP PRACTICE

1. Identification ,Specifications and testing Of R,L,C components, colour codes,potentiometers, coils and bread boards
2. Identification, Specifications and testing of devices like diodes, BJTs, JFETs, SCR and UJT.
3. Soldering of Simple Circuits using Active &Passive Components.
4. Study and operation of Transformers, Ammeters(Analog & Digital),Voltmeters(Analog &Digital) , Analog and Digital Multimeters and Function Generators, Regulated PowerSupply, Decade Resistance, Inductance &Capacitance Boxes And CRO.

LIST OF HARDWARE EXPERIMENTS:

1. V-I Characteristics Of Semiconductor Diode (Ge& Si), LED and Zener Diode
2. Half Wave And Full Wave Rectifier With And Without Filter
3. Characteristics Of BJT In CE Configuration
4. JFET Characteristics
5. Transistor Biasing Circuits And Transistor As Switch
6. CE Amplifier
7. JFET Common Source Amplifier

LIST OF SIMULATION EXPERIMENTS

1. Simulation of V-I Characteristics Of Semiconductor Diode, LED and Zener Diode
2. Simulation of Regulation Characteristics Of ZENER Diode
3. Simulation of CC Amplifier
4. Simulation of JFET Characteristics
5. Simulation of BJT Characteristics In CB Configuration
6. Simulation of JFET Amplifier
7. Simulation of UJT Characteristics

NOTE: (Minimum of Twelve Experiments Should Be Conducted)

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE 2107	
Course Title: ELECTRONICS DEVICES AND CIRCUITS LAB	
CO-1	Design and fabricate simple circuits like diode rectifiers with filters for providing dc voltages in electronic circuits.
CO-2	Design and fabricate amplifiers with required gain for use in various communication applications.
CO-3	Design and fabricate simple electronic circuits for everyday applications like traffic control lights using relays, automatic counters using LDRs and Burglar alarms.
CO-4	Design and fabricate simple circuits like diode rectifiers with filters for providing dc voltages in electronic circuits.

NETWORKS AND ELECTRICAL TECHNOLOGY LAB (B17 EE 2106)

LIST OF EXPERIMENTS

1. Maximum Power Transfer Theorem
2. Superposition Theorem
3. The venin's Theorem
4. Series Resonanc
5. Ohm‟s Law and Characteristics of Filament Lamp
6. Parameters of Iron Cored Inductor
7. Swinburne's Test
8. Load Test on Dc Shunt Motor
9. Load Test on Dc Series Motor
10. Load Test on 3 Phase Slip ring Induction Motor
11. OC and SC Test on Single Phase Transformer
12. Voltage Regulation of An Alternator by Synchronous Impedance Method
13. Speed Control of Dc Shunt Motor

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EE 2106	
Course Title: NETWORKS AND ELECTRICAL TECHNOLOGY LAB	
CO-1	Students will gain the skill to make and experiment with practical electric circuits.
CO-2	Students will be able to measure voltage, current, power in practical electric circuits.
CO-3	Students will know the significance of various theorems and their applications.
CO-4	Students will be able to model devices for circuit analysis.
CO-5	Students will be able to assess the behaviour of different electrical machines.
CO-6	Students will be able to predetermine the efficiency and regulation of different machines.

PROGRAMMING SKILLS-I(B17 BS 2106) (PYTHON)

(Common to ECE & EEE)

UNIT-I:

Overview, Environment Set Up, Basic Syntax, Identifiers, Reserved Words, Lines and Indentation, Multi-Line Statements, Quotation, Comments, Multiple Statements on a Single Line Variable Types, StandardData Types, Numbers (math, random, fraction) , Strings, Lists, Tuples , Dictionaries

UNIT-II:

Operators, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, DecisionMaking :if, if-else, nested if , Loops: for, while, nested loops

UNIT-III:

Functions, Function Arguments: Required arguments, Keyword arguments, Default arguments, Variable-length arguments, The Anonymous Functions: lambda, Scope of Variables, Modules, sys, os ,Date & Time

UNIT-IV:

Files & its operations, Exceptions, Standard Exceptions, Assertions, The try-finally Clause, Raising an Exception, User-Defined Exceptions, Classes and objects , OOPS, Data member , Function overloading, Instance variable, Inheritance, Instance, Instantiation, Operator overloading

UNIT-V:

HTML, CSS Basics, Data Base (SQLite), Database Connection, CRUD Application , CGI Architecture, WebServer Support and Configuration, GET and POST Methods, CGI Scripts.

UNIT-VI:

Project

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2106	
Course Title: PROGRAMMING SKILLS-I(PYTHON)	
CO-1	Ability to apply object oriented concepts in programming.
CO-2	Ability to define, understand and differentiate different types of data types and apply them.
CO-3	Ability to recognize various concepts of python and develops the programs using them and also develop web based application.

ENGLISH PROFICIENCY-I (B17BS2107)

(Common to All Branches)

UNIT-1: LISTENING

Selected Motivational Speeches

Selected Moral Stories

UNIT-2: SPEAKING

Book Review

Skit Presentation

PowerPoint Presentations

Describing event/place/thing

Extempore

Group Discussion

Picture Perception and Describing Test

UNIT-3: READING

Speeded Reading

Reading Comprehension

UNIT-4: WRITING

Paragraph Writing

Literary Appreciation – Understanding the Language of Literature

UNIT-5: PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2107	
Course Title: ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

Regulation: R17					**II/ IV - B.Tech. II- Semester**				
ELECTRONICS& COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 EC 2201	Electronic Circuit Analysis	ES	3	3	1	--	30	70	100
B17 EE 2203	Control Systems	ES	3	3	1	--	30	70	100
B17 EC 2202	Electromagnetic FieldTheory and Transmission Lines	ES	3	3	1	--	30	70	100
B17 EC 2203	Analog Communications	ES	3	3	1	--	30	70	100
B17 EC 2204	Computer Architectureand Organization	ES	3	3	1	--	30	70	100
B17 BS 2201	Management Science	BS	3	3	1	--	30	70	100
B17 EC 2207	Electronic Circuit Analysis Lab With Simulation	ES	2	--	--	3	50	50	100
B17 EC 2208	Analog Communication Lab	ES	2	--	--	3	50	50	100
B17 BS 2205	Programming Skills–II	BS	1	--	--	2	50	--	50
B17 BS 2204	Professional Ethics &Human Values	BS	--	2	--	--	--	--	--
B17 BS 2206	English Proficiency-II	BS	--	1	1	--	--	--	--
Total			**23**	**21**	**7**	**8**	**330**	**520**	**850**

SYLLABUS: ELECTRONIC CIRCUIT ANALYSIS (B17EC2201)

UNIT – I: Multistage Amplifiers

Transistor at high frequencies, CE short circuit current gain and concept of Gain Bandwidth product. BJT and FET RC coupled amplifiers at low and high frequencies. Frequency response and calculation of Band Width of Multistage Amplifiers.

UNIT – II: Feed Back Amplifiers

Concept of Feed Back Amplifiers - Effect of Negative Feedback on the amplifier characteristics.Four feedback topologies, Method of analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers.

UNIT – III: Sinusoidal Oscillators

Condition for oscillations and types of Oscillators – RC Oscillators: RC Phase Shift and Wien bridge Oscillators. LC Oscillators: Hartley, Colpitts, Clapp, Tuned Collector and Crystal Oscillators.

UNIT – IV: Power and Tuned Voltage Amplifiers

Classification of Power Amplifiers. Series fed, Transformer coupled class-A and class-B power amplifiers. Push Pull Class-A, Class-B and Class-AB Power Amplifiers. Cross-over Distortion inPure Class-B Power Amplifier and Class-AB Power Amplifier- Trickle Bias, Derating Factor and Heat Sinks – Complementary Push Pull Amplifier. Analysis of Single tuned, Double tuned and Stagger Tuned Amplifiers with gain and Bandwidth Calculations.

UNIT – V: Operational Amplifiers

Concept of Differential Amplifier. Differential Amplifier supplied with a constant current source. Calculation of common mode rejection ratio. Block diagram and Ideal characteristics of an Op-Amp. Applications of Op-Amp: Inverting and Non-Inverting amplifiers, Integrator, Differentiator, Summing, Subtracting and Logarithmic Amplifiers. Definition and Measurement of OP-Amp Parameters.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17EC2201	
Course Title: ELECTRONIC CIRCUIT ANALYSIS	
CO-1	Know the equivalent circuit of multistage amplifier and its analysis.
CO-2	Identify the different feedback topologies and analyze them.
CO-3	Explain the principle of oscillator and design different types of sinusoidal oscillators.
CO-4	Define the difference between voltage and power amplifiers and design different classes and know that Tuned amplifiers amplify a narrow band of frequencies and will also be able to analyze them.
CO-5	Identify that Op-amp not only amplifies but also performs different operations and analyze some of its applications.

SYLLABUS: CONTROL SYSTEMS (B17 EE 2203)

UNIT-I

Introduction to control systems- Open loop and closed loop systems- Transfer Functions of Linear Systems– Impulse Response of Linear Systems – Mathematical Modeling of Physical Systems – Equations of Electrical Networks – Modeling of Mechanical Systems – Equations of Mechanical Systems, Analogous Systems.

UNIT-II

Block Diagrams of Control Systems – Signal Flow Graphs (Simple Problems) – Reduction Techniques for Complex Block Diagrams and Signal Flow Graphs (Simple Examples)- Feedback Characteristics of Control Systems

UNIT-III

Time Domain Analysis of Control Systems – Time Response of First and Second Order Systems with Standard Input Signals – Steady State Error Constants – Effect of Derivative and Integral Control on Transient and Steady State Performance of Feedback Control Systems.

UNIT-IV

Concept of Stability– Routh-Hurwitz Criterion, Relative Stability Analysis, the Concept and Construction of Root Loci, Analysis of Control Systems with Root Locus (Simple Problems to understand theory).

UNIT-V

Frequency Domain Analysis of control systems - Bode Plots- Log Magnitude versus Phase Plots- Polar Plots -Correlation between Time and Frequency Responses - Nyquist StabilityCriterion -Assessment of Relative Stability -All Pass and Minimum Phase Systems - Constant M and N Circles.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EE 2203	
Course Title: CONTROL SYSTEMS	
CO-1	Students will be able to model electrical and mechanical physical systems by applying laws of physics.
CO-2	Students will be able to represent mathematical models of systems using block diagrams & Signal Flow Graphs and derive their transfer functions.
CO-3	Students will be able to analyze systems in time domain for transient and steady-state behaviour.
CO-4	Students will learn the concept of stability and use RH criterion and Root locus methods for stability analysis.
CO-5	Students will learn to obtain frequency response plots of systems and use them for system analysis and stability assessment.

SYLLABUS: ELECTROMAGNETIC FIELD THEORY & TRANSMISSION LINES (B17 EC 2202)

UNIT – I :Electrostatics: Introduction, Coulomb‟s law and electric field intensity, electric field due to different types of charge distributions, Field due to infinite line charge and finite line charge, Field due to infinite sheet charge, electric flux density, gauss‟s law and applications, Energy and potential, electric field in terms of potential gradient, electric dipole, stored energy in static electric field and energy density, convection and conduction currents, continuity equation, conductors in electric field, relaxation time, dielectrics in electric field, Laplace‟s and Poisson‟s equations, uniqueness theorem, different capacitance configurations, Boundary conditions on E &D at the interface between two media, Related Problems

UNIT – II: Magneto statics: Introduction, Biot-savart‟s law, Ampere‟s circuital law, applications of Ampere‟s circuital law, Point form of Ampere,s circuital law, magnetic flux density, Gauss‟s law for magnetic fields, scalar and vector magnetic potentials, forces due to magnetic fields, magnetization in materials, inductance, boundary conditions on H &B at the interface between two media, energy stored in steady magnetic field, Related problems.

UNIT – III Time varying fields and Maxwell's equations: Introduction, Faraday‟s law of electromagnetic induction, Transformer emf and motional emf, Maxwell‟s equations in integral and differential forms, word statements, Maxwell‟s equations using phasor notation, Boundary conditions on E , D ,H &B at the interface between two media, Retarded Potentials, Related problems.

UNIT – IV Electromagnetic Waves: Introduction, Wave equations for free space and for a conductive medium, uniform plane waves, properties of uniform plane waves, Relation between E and H in uniform plane wave, wave propagation in lossless and lossy media, Propagation in good conductors and good dielectrics, depth of penetration, polarization, Reflection of plane waves by a perfect conductor for normal and Oblique incidences, Reflection of plane waves by a perfect dielectric for normal and Oblique incidences, Brewster angle and critical angle, Poynting‟s theorem, Related Problems.

UNIT – V:Transmission lines and Rectangular Wave guides: Transmission lines - Introduction, types of transmission lines, equivalent circuit of transmission line, Primary and secondary constants of the line, Transmission line equations, characteristic impedance and expression for characteristic impedance, Reflection coefficient, standing wave ratio, lossless line, distortion less line, input impedance of transmission line, shorted and open circuited lines, impedance transformation with λ 8 , λ 4 and λ 2 lines, Construction of smith chart, applications of smith chart, Single stub matching, Related problems. Rectangular Waveguides - Introduction, TM modes in rectangular waveguides, TE modes in rectangular waveguides, Impossibility of TEM mode in waveguides, Characteristics of TE and TM modes, cutoff frequency, cutoff wavelength, phase and group velocities, characteristic wave impedance, dominant mode, related problems.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 2202	
Course Title: ELECTRO MAGNETIC FIELD THEORY & TRANSMISSION LINES	
CO-1	Ability to apply the knowledge of mathematics, Science and engineering to the Analysis and design of systems involving electric and magnetic fields as well as Electromagnetic Waves.
CO-2	Ability to identify, formulate and solve engineering problems in the area of electric and Magnetic fields and waves.
CO-3	Ability to use Maxwell's equations to solve electromagnetic field problems.
CO-4	Ability to apply the knowledge of electromagnetic fields in practical transmission lines and waveguides.

SYLLABUS: ANALOG COMMUNICATIONS (B17 EC 2203)

UNIT-I: Amplitude Modulation Systems:

Need for Frequency Translation, A Method for Frequency Translation, Amplitude Modulation, AM Modulators, Envelope detector, Square law demodulator, Maximum Allowable Modulation for Rectifier Detection, Spectrum and Power Efficiency, DSB-SC Modulation and its Spectrum, Balanced Modulator, Synchronous Detectors, SSB Modulation, SSB Modulators (Filter Method, Phase Shift Method), SSB Demodulator, Vestigial Side Band Modulation, Quadrature AmplitudeModulation, Frequency Division Multiplexing.

UNIT-II: Angle Modulation:

Angle Modulation, Phase and Frequency Modulation, Relationship between Phase and Frequency Modulation, Phase and Frequency Deviation, Spectrum of an FM Signal, Bandwidth of Sinusoidally Modulated FM Signal, Effect of the Modulation Index on Bandwidth, Spectrum of Constant Bandwidth FM, Phasor Diagram for FM Signals.FM Generation: Parameter variation method, Armstrong"s Indirect method, Frequency Multiplication and application toFM, FM Demodulator, FM Demodulation using PLL, Pre – emphasis and De – emphasis.

UNIT-III: Noise in AM and FM Systems:

Sources of Noise, Resistor Noise, Shot Noise, Noise in AM Systems, Noise in FrequencyModulation Systems, Comparison between AM and FM with respect to Noise, Pre-Emphasis and De-emphasis and SNR Improvement, Threshold in Frequency Modulation.

UNIT-IV: Radio Transmitters:

Classification of Radio Transmitters, AM and FM Transmitters, Radio Telegraph and Telephone Transmitters, SSB Transmitters.

UNIT-V: Radio Receivers:

Radio receiver Types-Tuned Radio Frequency Receiver, Super Heterodyne Receiver, AM Receivers: RF Section and Characteristics, Frequency Changing and Tracking, IntermediateFrequency and IF Amplifiers, Detection and Automatic Gain Control (AGC), FM Receivers: Amplitude Limiting, FM Demodulators, Comparison with AM Receivers. Communication Receivers: Extensions of Super-heterodyne Principles, Additional Circuits, SSB and ISB Receivers.

Course Outcomes for Second Year Second Semester Course	
Course Code:B17 EC 2203	
Course Title: ANALOG COMMUNICATIONS	
CO-1	Understand the need for modulation and the concepts of Amplitude Modulation and Demodulation techniques and evaluate various parameters in time and frequency Domain.
CO-2	Understand the concepts of Angle Modulation and Demodulation techniques and Evaluate various parameters of Angle modulated waveform in Time and Frequency Domain
CO-3	Analyze and compare the performance of various analog modulation techniques in the presence of noise.
CO-4	Analyze different characteristics of transmitters.
CO-5	Analyze different characteristics of receivers.

SYLLABUS: COMPUTER ARCHITECTURE AND ORGANIZATION (B17EC2204)

UNIT -I: Register Transfer and Micro operations:

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

UNIT -II: Basic Computer Organization:

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, InstructionCycle, Memory Reference Instructions, Input - Output and Interrupt, Complete Computer Description.

UNIT -III: Micro programmed Control:

Control Memory, Address Sequencing, Microinstruction Formats, Micro program Example,Design of Control Unit.

CPU Organization: Introduction, General Register Organization, Stack Organization InstructionFormats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

UNIT-IV: Input – Output Organization:

Peripheral Devices, Input - Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input- Output processor, CPU-IOPcommunication.

UNIT- V: Memory Organization:

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 2204	
Course Title: COMPUTER ARCHITECTUE AND ORGANIZATION	
CO-1	Understand how computers represent and manipulates data.
CO-2	Develop the general architecture design of a digital computer.
CO-3	Learn the art of Microprogramming.
CO-4	Develop independent learning skills to interface main memory & I/O.

SYLLABUS: MANAGEMENT SCIENCE (B17 BS 2201)
(Common to ECE & EEE)

UNIT-I: Introduction to Management

Concept, Nature and importance of Management, Functions of management, Evolution ofManagement thought, Fayol"s principles of Management, Theories of Motivation, Decision making process.

UNIT-II: Marketing Management

Concept, Functions of marketing, Marketing Mix, Marketing strategies based on Product life cycle, Channels of distribution.

UNIT-III: Human Resource Management (HRM)

Concepts of HRM, Personal Management and Industrial Relations, Basic functions of HR Manager-Man power planning, Recruitment, Selection, Placement, Training, Development, Compensation and Performance Appraisal.

UNIT-IV: Production Management

Production planning &control (PPC), Objectives, Functions, Stages of PPC, Plant location (SiteSelection).
Financial Management
Types of capital- Fixed and Working Capital, Methods of Raising finance. Long-term, Medium-term and Short-term financial sources.

UNIT-V: Strategic Management

Vision, Mission, Goals, objectives, policy, strategy, Elements of corporate planning process, Environmental scanning, SWOT analysis Steps in strategy formulation and implementation of Generic strategy alternatives

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2201	
Course Title: MANAGEMENT SCIENCE	
CO-1	Create awareness about the concepts like Evolution of Management thought, functions & principles of management.
CO-2	Provide all round information to the students about matters related to concepts & functions related to Marketing.
CO-3	Acquire in-depth knowledge about the concepts and functions of HRM.
CO-4	Understand about aspects of Production Management and Financial Management
	Gain knowledge about Strategy formulation & implementation, SWOT analysis in order to compete with the competition & to gain competency advantage.

ELECTRONIC CIRCUIT ANALYSIS LAB WITH SIMULATION (B17 EC 2207)

LIST OF EXPERIMENTS

1. Design of LC Oscillators (Hartley Oscillator, Colpitts Oscillator)
2. Design of RC Oscillators (Wien Bridge Oscillator, RC phase Shift Oscillator)
3. Design of Basic Applications of Operational Amplifier.
4. Frequency response of Two Stage RC Coupled Amplifier.
5. Frequency response of Current Series Feedback Amplifier(with and without feedback)
6. Measurement of resonant frequency, bandwidth and quality factor of single Tuned VoltageAmplifier.
7. Calculation of Collector Circuit efficiency of Class B Push Pull Power Amplifier.
8. Applications of Operational Amplifiers.

LIST OF EXPERIMENTS
(Simulation)

9. Design of LC Oscillators (Hartley Oscillator, Colpitts Oscillator)
10. Design of RC Oscillators (Wien Bridge Oscillator, RC phase Shift Oscillator)
11. Design of Basic Applications of Operational Amplifier.
12. Frequency response of Two Stage RC Coupled Amplifier.
13. Frequency response of Current Series Feedback Amplifier(with and without feedback)
14. Measurement of resonant frequency, bandwidth and quality factor of single Tuned VoltageAmplifier.
15. Calculation of Collector Circuit efficiency of Class B Push Pull Power Amplifier.
16. Applications of Operational Amplifiers.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 2207	
Course Title: ANALOG ELECTRONIC CIRCUITS LAB WITH SIMULATION	
CO-1	Acquire a basic knowledge on simple applications of operational amplifier.
CO-2	Observe the amplitude and frequency responses of negative feedback amplifier and two stages RC coupled amplifier.
CO-3	Design and test sinusoidal oscillators.
CO-4	Design and test a power amplifier.
CO-5	Design, construct and take measurement of the analog electronic circuits to compare experimental results in the laboratory with theoretical analysis.
CO-6	Use Multisim to test their electronic design.

SYLLABUS: ANALOG COMMUNICATION LABORATORY (B17 EC 2208)

Generation of AM Signal and measurement of Modulation Index.

Diode Detector for AM Signals.

Generation of FM Signal.

FM Detector.

Receiver Measurements/RF Amplifier

Balanced Modulator.

Passive/Active Filters (LPF, HPF, BPF).

Attenuator/Equalizer/ Twin-T-Network.

Frequency Multiplier/Limiter.

SSB Generation and Detection.

Pre-emphasis and De-emphasis.

IF Amplifier.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 2208	
Course Title: ANALOG COMMUNICATION LAB	
CO-1	Design and implement modulation and demodulation circuits for amplitude modulation technique.
CO-2	Design and implement modulation and demodulation circuits for frequency modulation technique.
CO-3	Design second order passive and active filters for various frequency bands.
CO-4	Construct the circuit and study the characteristics of different transmitter and receiver circuits such as Harmonic generator, RF Amplifier, IF Amplifier, pre-emphasis and de-emphasis.

SYLLABUS: PROGRAMMING SKILLS-II (B17 BS 2205)
(JAVA)
(Common to ECE & EEE)

UNIT-I:

Overview, Environment Set Up, Basic Syntax, Identifiers, Reserved words, Data Types, Literals,Basic Operators

UNIT-II:

Control Statements in Java: if...else statement, for, while, do-while, for-each, Nested for loops, switch, break, continue, return, Objects & Classes, Access Specifiers, Input & Output, Arrays, Strings

UNIT-III:

Methods, Relationship between objects, Object-Oriented Programming: Encapsulation, Abstraction, Inheritance, Polymorphism, Interfaces, Type Casting, Packages

UNIT-IV:

Exception Handling: try, catch, final, finally, throw, throws, Built-in, User-defined Exceptions,Files: Read, Write and Append operations using text streams & byte streams

UNIT-V:

Collection Framework, Generics

UNIT-VI:

Threads: life cycle, single tasking, multi-tasking, Deadlocks, Thread Priorities, Daemon Threads,Serialization

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2205	
Course Title: PROGRAMMING SKILLS-II(JAVA)	
CO-1	Ability to define different procedural and object oriented concepts and will be able to differentiate between them.
CO-2	Ability to define, understand and differentiate different types of arrays and apply them.
CO-3	Ability to recognize various concepts of java and develops the programs using them.
CO-4	Ability to identify and differentiate the various features of AWT components to construct container based programs

SYLLABUS: PROFESSIONAL ETHICS & HUMAN VALUES (B17BS2204)
(Common to CSE, ECE & IT)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, HumanValues – Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics , Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:

Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:

Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination,Sexual harassment at work place.

UNIT – V

Global Issues:

Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living,concept of Harmony in life.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2204	
Course Title: PROFESSIONAL ETHICS & HUMAN VALUES	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.

SYLLABUS: ENGLISH PROFICIENCY-II (B17 BS 2206)
(Common to All Branches)

UNIT-1: SPEAKING

Analyzing proverbs

Enactment of One-act play

UNIT-2: READING

Reading Comprehension

Summarizing Newspaper Article

UNIT-3: WRITING

Note Taking &Note Making

Precis Writing

Essay Writing

Letter Writing

Picture Description

Literary Appreciation– Learning the Language of Literature

UNIT-4: VOCABULARY

Indian-origin English Words

Phrasal Verbs for Day-to-Day Communication

Commonly used Idiomatic Expressions

UNIT-5: PROJECT

Research Writing

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2204	
Course Title: PROFESSIONAL ETHICS & HUMAN VALUES	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Regulation: R17				III/ IV - B.Tech. I- Semester					
ELECTRONICS& COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 EC 3101	Pulse and Digital Circuits	ES	3	3	1	--	30	70	100
B17 EC 3102	Linear ICs and Applications	ES	3	3	1	--	30	70	100
B17 EC3103	Electronic Measurements And Instrumentation	ES	3	3	1	--	30	70	100
B17 EC3104	Digital Communication	ES	3	3	1	--	30	70	100
B17 EC3105	Antennas and Propagation	ES	3	3	1	--	30	70	100
B17 EC3106	Computer Network Engineering	ES	3	3	1	--	30	70	100
B17 EC3107	Linear Integrated Circuits and PulseCircuits Lab with Simulation	ES	2	--	--	3	50	50	100
B17 EC3108	Digital ICs Laboratory with simulation	ES	2	--	--	3	50	50	100
B17 BS3101	Problem Solving& Linguistic Competence	ES	1	--	3	--	30	70	100
B17 BS3102	Basic Coding	ES	1	--	--	3	50	50	100
Total			**24**	**18**	**9**	**9**	**360**	**640**	**1000**

SYLLABUS: PULSE AND DIGITAL CIRCUITS (B17 EC 3101)

UNIT-I: Linear Wave Shaping:

High pass, low pass RC circuits-response to sinusoidal, step, pulse, square and ramp inputs, The High pass RC circuit as a differentiator and the Low pass RC circuit as an integrator, Attenuators.

UNIT-II: Non-linear wave shaping:

Diode clippers, Clippers at two independent levels, Transfer characteristics of clippers, Transistor clipper, Emitter coupled clipper, Clamping operation, diode clamping circuits withsource resistance and diode resistance -transient and steady state response for a square wave input, clamping circuit theorem.

UNIT-III: Bi-stable multi vibrators:

Transistor as a Switch, Transistor switching timings, a basic binary circuit-explanation.

Fixed-bias transistor binary, self-biased transistor binary, binary with commutating

Capacitors-analysis, Non-saturated binary–symmetrical triggering, and Schmit trigger circuit-emitter coupled binary circuit.

Mono-stable multi vibrator: Basic circuit-collector coupled monostable multivibrator-explanation.

Astable multi vibrator: The collector coupled Astable multivibrator-explanation.

UNIT-IV: Time –Base Generators:

Voltage sweep -- Simple Exponential sweep Generator. Errors that define Deviation from linearity, UJT Relaxation Oscillator – Methods of linearizing a Voltage Sweep – Bootstrap and Miller Circuits – Current Sweep – Linearizing a current Sweep by adjusting the driving Waveform.

UNIT-V: Synchronization and frequency division:

Pulse synchronization of relaxation devices, frequency division in the sweep circuit, Synchronization of A stable multivibrator, Monostable multivibrator, synchronization frequency division with a sweep circuit.

Digital logic Families: Introduction, RTL, DTL, TTL, ECL, NMOS logic, PMOS logic, CMOS logic-analysis

Course Outcomes for Second Year Second Semester Course	
Course Outcomes for Third Year First Semester Course	
Course Code: B17 EC 3101	
Course Title: PULSE AND DIGITAL CIRCUITS	
CO-1	Understand the applications of Integrator, differentiator circuits.
CO-2	Design of different clipping circuits and understand the applications clamper circuits.
CO-3	Analyze different Bi-stable, Monostable, A stable Multivibrators and Schmitt trigger for various applications.
CO-4	Understand Different Time Base Generators.
CO-5	Analyze synchronization techniques for sweep circuits and to understand different logic families; realize logic gates using diodes and transistors.

SYLLABUS: LINEAR ICS AND APPLICATIONS (B17 EC 3102)

UNIT-I: Applications of Operational Amplifiers:

Basics of Op-Amp, Block Diagram, open loop and closed loop op-amp configurations, Frequency compensation Techniques, Logarithmic Amplifier, Instrumentation Amplifiers, Voltage to Current and Current to Voltage Converters. Op-amp As a Comparators, Schmitt trigger, Wave form Generators, Sample and Hold Circuits, Rectifiers, Peak Detection

UNIT-II: Active Filters:

Butterworth type LPF, HPF, BPF, BEF, All-pass Filters, Higher Order Filters and their Comparison, Switched Capacitance Filters.

UNIT-III: Oscillators:

Op-Amp Phase Shift, Wien-bridge and Quadrature Oscillator, Voltage Controlled Oscillators, Analog Multiplexers.

UNIT-IV: Special ICs:

555 Timers, 556 Function Generator ICs and their Applications, Three Terminal IC Regulators, IC 565 PLL and its Applications, Voltage to Frequency and Frequency to Voltage Converters.

UNIT-V: Digital to Analog and Analog to Digital Converters:

DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, Different types of ADCs-parallel Comparator type ADC, Counter type ADC, Successive approximation ADC and ADC specifications.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3102	
Course Title: LINEAR ICS AND APPLICATIONS	
CO-1	Understand the external behaviour and characteristics of operational amplifier.
CO-2	Design and analyze linear and non-linear circuits using operational amplifier.
CO-3	Design and analyze oscillators and active filters using operational amplifier.
CO-4	Design and analyze various applications using IC 565 and IC 555.
CO-5	Understand the operation of Analog to Digital and Digital to Analog Converters.

ELECTRONIC SYLLABUS: MEASUREMENTS AND INSTRUMENTATION (B17 EC 3103)

UNIT-I:

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltmeters- Multi range, Range extension voltmeters, AC voltmeters, True RMS responding voltmeter, Electronic Multimeter.

UNIT-II:

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors. Introduction to smart sensors.

UNIT-III:

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line. Dual beam CRO, .Dual trace oscilloscope, sampling oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO.

UNIT – IV:

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance – Schearing Bridge. Wheatstone bridge. Wien Bridge, Errors and precautions inusing bridges.

UNIT – V:

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform. Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3103	
Course Title: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	
CO-1	Evaluate basics of measurement systems, principle of basic meter
CO-2	Evaluate how a signal can be generated using different types of meters.
CO-3	Investigate a signal / waveform with different oscillators.
CO-4	Use bridges of many types and measure appropriate parameters
CO-5	Design different transducers for measurement of different parameters.

SYLLABUS: DIGITAL COMMUNICATION (B17 EC 3104)

UNIT-I: Pulse Modulation and Digital Representation of Analog Signal:

Sampling, Pulse Amplitude Modulation and Concept of Time Division Multiplexing, Pulse Width Modulation, Pulse Position Modulation, Digital representation of analog signal: Quantization of signals, Quantization error, Pulse Code Modulation, Companding, T1 Digital system, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Continuously Variable Slope Delta Modulation.

UNIT-II: Digital Modulation and Transmission:

Binary Phase-Shift Keying, Differential Phase-Shift Keying, Differentially-Encoded PSK (DEPSK), Quadrature Phase-Shift Keying (QPSK), M-ary PSK, Binary Frequency Shift- Keying, Comparison of BFSK and BPSK, M-ary FSK, Minimum Shift Keying (MSK), Duo- binary Encoding.

UNIT-III: Mathematical Representation of Noise:

Some Sources of Noise, Frequency-domain representation of Noise, Spectral Components of Noise, Response of a Narrowband Filter to Noise, Effect of a Filter on the Power Spectral Density of Noise, Superposition of Noises, Linear Filtering, Noise Bandwidth, Quadrature Components of Noise, Power Spectral Density of Quadrature Components of Noise.

UNIT-IV: Optimal Reception of Digital Signal:

A Base-band Signal Receiver, Probability of Error, Optimum Receiver for both Baseband andPass band - Calculation of optimum filter Transfer function, Optimum filter realization using Matched filter, Probability of Error of the Matched Filter, Optimum filter realization using Correlator, Optimal of Coherent Reception: PSK, FSK, QPSK, Comparison of Modulation Systems.

UNIT-V: Noise in Pulse Code Modulation and Delta Modulation Systems:

PCM Transmission, Calculation of Signal-to-Noise Ratio in PCM, Delta Modulation (DM)Transmission, Calculation of Signal-to-Noise Ratio in DM, Comparison of PCM and DM. Introduction to Spread Spectrum Modulation: Direct Sequence (DS) Spread Spectrum,Use of Spread Spectrum with Code Division Multiple Access (CDMA), Ranging using DSSpread Spectrum, Frequency Hopping (FH) Spread Spectrum, Generation and Characteristicsof PN Sequences

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3104	
Course Title: DIGITAL COMMUNICATION	
CO-1	Understand the basic concepts of sampling and digital communication systems.
CO-2	Understand the concept of binary and M-ary modulation techniques.
CO-3	Understand the problems of noise and can design any digital communication system for the real time environment.
CO-4	Designing of optimal receiver and understanding the concept of probability of error.
CO-5	Analyze the error performance of two digital modulation techniques and understand the concept of spread spectrum communication system

SYLLABUS: ANTENNAS & PROPAGATION B17 EC 3105)

UNIT-I: Fundamentals of Antennas & Radiation from Antennas:

Definition of antennas, functions of Antennas, properties of antennas, antenna parameters, polarization, basic antenna elements, radiation mechanism, radiating fields of alternating current element, radiated power and radiation resistance of current element, different types of current distribution on linear antennas, radiated fields, radiated power and radiation resistance of half-wave dipole and quarter – wave monopole, directional characteristics of dipole antennas.

UNIT-II: Linear Arrays:

Uniform linear arrays, field strength of a uniform linear arrays, locations of principal maximum, null and secondary maxima, first side lobe level, analysis of broad side and end fire , Pattern multiplication, binomial arrays, effect of earth on vertical patterns, methods of excitation of antennas, impedance matching techniques, transmission loss between transmitting and receiving antennas – Friis formula, antenna noise temperature and signal-to- noise ratio, Introduction to array synthesis Methods.

UNIT-III: Practical Antennas – LF, MF, HF, VHF& UHF antennas

Classification of antennas according to type of radiation and type of current distribution of antennas – Isotropic, Omni directional & directional antennas, standing wave and travelling wave antennas, Classification according to frequency of operation – LF, MF, HF, VHF & UHF, brief introduction to LF & MF antennas, earth mat, counterpoise earth, top capacitance hat.

HF, VHF & UHF Antennas - V Antennas, Inverted V Antennas, Rhombic antennas, folded dipole, Yagi-Uda antenna, Log periodic antenna, Loop and Helical Antennas.

UNIT – IV: Microwave antennas:

Introduction, types of reflector antennas, corner reflector, parabolic reflector, feed systemsfor parabolic reflector, horn antennas, slot antennas and impedance of slot antennas, Babinet's principle and micro strip antennas.

Antenna measurements: Introduction, measurement ranges, antenna impedance measurements, antenna gain and directivity measurement, measurement of radiation pattern, beam width and SLL.

UNIT-V: Wave Propagation

Types of radio wave propagation, ground wave propagation and Somerfield's analysis of ground wave propagation, wave tilt of ground wave, structure of ionosphere, refractive index of ionosphere, mechanism of wave bending by ionosphere, critical frequency, MUF, Skip distance, fading and remedial measures, effect of earth's magnetic field on ionosphere propagation, faraday rotation, tropospheric (space wave) propagation, range of space wave propagation, effective earth radius, field strength of space wave, atmospheric effects on spacewave propagation, duct propagation and scatter propagation.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3105	
Course Title: ANTENNAS & PROPAGATION	
CO-1	Understand Radiation mechanism and functions of antennas, identify antenna parameters derive expressions for antenna parameters.
CO-2	Analyze and design wire and aperture antennas for different applications.
CO-3	Analyze and design Antenna arrays.
CO-4	Capable of performing various antenna measurements and come up with conclusions about antenna parameters and performance
CO-5	Identify characteristics of radio wave propagation and be able to design different types of communication links for different frequency bands

SYLLABUS: COMPUTER NETWORK ENGINEERING (B17 EC 3106)

UNIT-I

Uses of Computer Networks, Line Configuration, Topology, Transmission mode, Categories of Networks-LAN, MAN, WAN; Network Software- Protocol Hierarchies, Design issues of layers, Connection Oriented and Connectionless services; Reference Models- The OSI Reference Model, The TCP/IP Reference Model, The B-ISDN ATM Reference Model.

UNIT-II

Theoretical basis for Data communication, Transmission media- Guided and Unguided Transmission media; The Telephone System-Structure of Telephone system, Trunks and Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Switching-Circuit Switching, The Switch Hierarchy, Crossbar switches, Space Division Switches, Time Division Switches; Narrow band ISDN, Broadband ISDN and ATM-Virtual Circuits versus Circuit Switching.

UNIT-III

DATA LINK LAYER

Design issues, Error Detection and Correction, Elementary Data link protocols, Sliding window protocols, HDLC, Medium access sub layer-The Channel allocation problem, Multiple Access Protocols-ALOHA, Carrier Sense Multiple Access protocols; IEEE standard for 802 LANs, Satellite Networks

UNIT-IV NETWORK LAYER

Design considerations, Difference between Gateways, Ethernet switch, Router, Hub, Repeater, Congestion Control algorithms- General principles of Congestion Control, Congestion prevention policies. The Leaky bucket algorithm and Token bucket algorithm, The Network Layer in the Internet- The IP Protocol, IP Addresses.

UNIT-V TRANSPORT LAYER

The Transport layer Service, Elements of Transport protocols, The Internet Transport Protocols- UDP, TCP.

APPLICATION LAYER

The Domain Name System, Electronic mail, The World Wide Web.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3106	
Course Title: COMPUTER NETWORK ENGINEERING	
CO-1	Explain basic computer network principles and layers of the OSI model and TCP/IP.
CO-2	Explain the concepts of transmission media, switching and multiplexing techniques.
CO-3	Explain and analyze the error control and flow control methods.
CO-4	Explain different multiple access control protocols and IEEE standards for LANs and MANs
CO-5	Identify the different types of connecting devices and explain the basic concepts of congestion control algorithms and internetworking.
CO-6	Explain TCP and UDP header formats

LINEAR INTEGRATED CIRCUITS & PULSE CIRCUTS LAB WITH SIMULATION (B17 EC 3107)

LIST OF EXPERIMENTS

1. Linear Wave Shaping
   a) Passive RC Differentiator
   b) Passive RC Integrator
2. Non Linear Wave shaping
   a) Clipping Circuits
   b) Clamping Circuits
3. Self-bias bi stable Multi vibrator
4. Schmitt Trigger Using µA 741
5. UJT Sweep Generator
6. A stable Multi vibrator using 555 timer
7. Multiplexer
8. Shift Registers

LIST OF EXPERIMENTS

(Simulation)

1. Linear Wave Shaping
   a) Passive RC Differentiator
   b) Passive RC Integrator
2. Non Linear Wave shaping
   a) Clipping Circuits
   b) Clamping Circuits
3. Self-bias bi stable Multi vibrator
4. Schmitt Trigger Using µA 741
5. UJT Sweep Generator
6. A stable Multi vibrator using 555 timer.
7. Multiplexer
8. Shift Registers

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3107	
Course Title: LINEAR INTEGRATED CIRCUITS & PULSE CIRCUTS LAB WITH SIMULATION	
CO-1	Design and conduct experiments on RC low pass and high pass circuits.
CO-2	Observe operation of UJT Sweep Generator.
CO-3	Design and test different types of Multi vibrators
CO-4	Acquire a basic knowledge on simple applications of operational amplifier.
CO-5	Design, construct Schmitt trigger using operational amplifier.
CO-6	Use Multisim to test their electronic designs.

DIGITAL IC'S LABORATORY WITH SIMULATION (B17 EC 3108)

LIST OF EXPERIMENTS

A. HARDWARE

1. Verify the operation of following digital components using Digital Trainer Kit
   a. Full adder using gates
   b. Full subtract or using gates
2. Design and verify the logic functions of multiplexer and de-multiplexers using digitaltrainer kit
3. Design code convertors using digital trainer kit
   a. BCD TO SEVEN segment display
   b. Priority encoder
4. Verify the operation of following flip-flops using Digital Trainer Kit
   a. JK flip flop
   b. D flip flop
   c. T flip flop
5. Design a following synchronous counters using Digital Trainer Kit
   a. Mod 16 counter
   b. Mod 8 counter
   c. Decade counter
6. Verify the functioning of shift register using Digital Trainer Kit

B. SOFTWARE

7. Verify the operation of following digital components using ISE Simulator
   a. Full adder
   b. Full subtractor
8. Verify the operation of multiplexer and priority encoder using ISE Simulator
9. Design ALU and verify the operation using ISE Simulator
10. Design RAM for read/write operations using ISE Simulator

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 EC 3108	
Course Title: DIGITAL IC'S LABORATORY WITH SIMULATION	
CO-1	Synthesize, simulate and implement a digital design in a configurable digital circuit with computer supported aid tools and digital trainer kit.
CO-2	Acquire Knowledge of analysis and synthesis of combinational and sequential circuits with simulators and digital trainer kits.
CO-3	Build high level programming (HDL programming) skills for digital circuits.
CO-4	Adapt digital circuits to electronics and telecommunication field.

Code: PROBLEM SOLVING & LINGUISTIC COMPETENCE (B17BS3101)
(Common to all Branches)
Part-A: Verbal and Soft Skills-I

Grammar: (VA)

Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns-number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause , conditional and relative clauses), phrases(use of the phrases, phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees ofcomparison, modifiers, determiners, identifying errors in a given sentence, correcting errorsin sentences.

Vocabulary: (VA)

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants (with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meaningsof the same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning: (VA)

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage: (VA)

Sentence completion (with emphasis on signpost words and structure of a sentence), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:

Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis – Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for Goal Setting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - StressManagement, CV Making and CV Review.

Part-B: Quantitative Aptitude –I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, introducing the concept ofratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work, Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of timeand distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.

Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships, shares and dividends

Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking,directions Problems of how to find the next number in the series, Finding the missing number and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directionsnorth, south, east, west.

Data sufficiency, Syllogisms Easy sums to understand data sufficiency, Frequent mistakeswhile doing data sufficiency, Syllogisms Problems.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17BS3101	
Course Title: PROBLEM SOLVING & LINGUISTIC COMPETENCE	
PART-A (Verbal and Soft Skills-I)	
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
PART-B (Quantitative Aptitude –I)	
CO-1	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-2	Accurate solving problems on time and distance and units related solutions.
CO-3	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-4	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any Person to be placed in the industry.
CO-5	The students will learn to apply Logical thinking to the problems of syllogisms and be able to effectively attempt competitive examinations like CAT, GRE, and GATE for further studies.

SYLLABUS: BASIC CODING (B17 BS 3102)
(Common to ECE & EEE)

UNIT-I Review of Programming constructs

Programming Environment, Expressions formation, Expression evaluation, Input and Output patterns, Control Structures, Sequential branching, Unconditional branching, Loop Structures, Coding for Pattern Display.

UNIT-II Introduction to Linear Data, strings and pointers

Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding, Working on character data, Compiler defined methods, Substitution coding for defined methods, Row Major representation, Column Major representation, Basic searching andsorting Methods.

UNIT-III Functions, Recursions and Storage Classes

Functions – Introduction to modular programming – Function Communication - Pass by value, Pass by reference – Function pointers – Recursions – Type casting – Storage classes

Practice: programs on passing an array and catching by a pointer, function returning data,comparison between recursive and Iterative solutions.

Data referencing mechanisms: Pointing to diff. data types, Referencing to Linear data,Runtime-memory allocation, Named locations vs pointed locations, Referencing a 2D-Matrix

UNIT-IV User-defined data types, Pre-processor Directives and standard storage

Need for user-defined data type – structure definition – Structure declaration – Array within aStructure – Array of Structures – Nested Structures - Unions – Declaration of Union data type, Struct Vs Union - Enum – Pre-processor directives , Standard storage methods, Operations on file, File handling methods, Orientation to Object oriented programming

Practice: Structure padding, user-defined data storage and retrieval programs

UNIT-V Operating system principles and Database concepts

Introduction to Operating system principles, Process scheduling algorithms, Deadlock detection and avoidance, Memory management, networking: Introduction to Networking, OSI Model Vs. TCP/IP suite, Data link layer, Internet layer, DVR Vs. LSR, Transport Layer, Application Layer

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 3102	
Course Title: BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

Regulation: R17				III/ IV - B.Tech. II- Semester					
ELECTRONICS& COMMNICATION ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	Name of the Subject	Category	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
B17 EC 3201	Microprocessors and its Applications	ES	3	3	1	--	30	70	100
B17 EC 3202	Microwave Engineering	ES	3	3	1	--	30	70	100
B17 EC 3203	VLSI Design	ES	3	3	1	--	30	70	100
B17 EC 3204	Digital Signal Processing	ES	3	3	1	--	30	70	100
B17 EC 3205	Radar Engineering	ES	3	3	1	--	30	70	100
#OE	OPEN ELECTIVE	ES	3	3	1	--	30	70	100
B17 EC 3208	Microprocessors and Microcontrollers Lab	ES	2	--	--	3	50	50	100
B17 EC 3209	VLSI Lab	ES	2	--	--	3	50	50	100
B17 BS3201	Employability Skills	BS	1	--	3	--	30	70	100
B17 BS3203	Advanced Coding	BS	1	--	--	3	50	50	100
B17 BS 3206	IPR & PATENTS	BS	--	--	2	--	--	--	--
Total			**24**	**18**	**11**	**9**	**360**	**640**	**1000**

OPEN ELECTIVE	B17EC3206	Microcontrollers
	B17CS3214	Oops through Java
	B17CS3215	Data Mining
	B17ME3210	Industrial Robotics
	B17EE3209	Power Electronics
	B17EC3207	Bio Medical Engineering
	B17CS3216	Artificial Neural Networks

SYLLABUS: MICROPROCESSORS AND ITS APPLICATIONS (B17 EC 3201)

UNIT-I: 8085 Architecture:

Bus structure of 8085,internal architecture and functional description of INTEL 8085 Microprocessor pin out & signals, flag register, Fetch cycle ,memory Read /Write and I/O Read /Write Cycles with Timing Diagrams , Stack memory organization, Interrupt structure of 8085,Vectored, non-vectored, maskable and non maskable interrupts, pending interrupts, execution of SIM and RIM instructions.

UNIT-II: 8085 Programming:

Introduction to 8085 Assembly Language Programming, Programming model of 8085 and function of each register, Addressing modes of 8085 with examples, I/O addressing, Stack memory operation using PUSH and POP instructions, Classification of 8085 instructions with examples, Instruction set, Sample Programs, Subroutines, CALL and RET instructions, and Interrupt Service Routines.

UNIT-III: 8085 Interfacing:

Interfacing of semiconductor Memory and I/O devices to 8085, Classification of Read /Write and Read only memories, Interfacing of SRAMs, DRAMs and EPROMs using 74LS138.Functional description of PPI(8255),PIT(8253/8254) andUSART(8251A).Interfacing of parallel I/O (8255), Timer/Counter (8253/8254), Serial I/O (8251A) with 8085 Microprocessor.

UNIT-IV: 8086/8088 Architecture:

Internal Architecture and Functional description of INTEL 8086/8088 microprocessor, and their comparisons. Memory segmentation and physical memory address generation, pipeline architecture and instruction queue .Register organisation, Status flags and machine control flags of 8086, pin out and signals in detail, Memory read /write and I/O read/Write Bus cycles with timing diagrams, 8086 memory Banks,8086 minimum and maximum modes of operation.

UNIT-V: 8086 Programming:

Introduction to 8086 Assembly language programming, programmable register array of 8086 and function of each register, Data addressing modes of 8086 with examples, fixed and variable I/O addressing. Stack memory operation, classification of 8086 instructions, sample 8086 assembly language programs using data transfer, Arithmetic and logic instructions, Introduction to ARM.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3201	
Course Title: MICROPROCESSORS AND ITS APPLICATIONS	
CO-1	Understand and analyze architecture of the 8085 microprocessor
CO-2	Be familiar with the 8085 Assembly Language Programming
CO-3	Be familiar with Hardware and software requirements in interfacing and designing 8085 microprocessor based products for practical applications
CO-4	Understand and analyze architecture of the 8086 microprocessor
CO-5	Be familiar with the 8086 Assembly Language Programming

SYLLABUS: MICROWAVE ENGINEERING (B17 EC 3202)

UNIT-I: Microwave Components and its applications:

Introduction, Microwave Spectrum and Bands, Applications of Microwaves, Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide irises, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types, E-plane and H-plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2Hole, Bethe Hole types, Ferrite Components– Faraday Rotation, Gyrator, Isolator, Circulator, Related Problems.

UNIT-II: Scattering Matrix:

Scattering Matrix – Significance, Formulation and Properties, Scattering Matrix of Isolator, circulator, directional coupler, E Plane Tee, H plane Tee and Magic Tee.

UNIT-III: Qualitative treatment on Microwave Tubes:

Limitations and Losses of conventional tubes at microwave frequencies. Re-entrant Cavities, Microwave tubes – O type and M type classifications. O-type tubes :2 CavityKlystrons – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory, Applications, Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Electronic Admittance; Electronic and Mechanical Tuning, Applications, Related Problems.

HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT (Qualitative treatment).

M-type Tubes Introduction, Cross-field effects, Magnetrons – Different Types, 8-CavityCylindrical Travelling Wave Magnetron – Hull Cut-off Condition, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics.

UNIT-IV: Microwave Solid state Devices:

Negative resistance phenomenon, Gunn Diode, domain formation, Tunnel Diode- principle of operation, IMPATT- principle of operation, TRAPATT, PIN Diodes and its applications (Qualitative analysis only).Detector diode or point contact diode and its characteristics.

UNIT-V: Microwave Measurements:

Microwave Test bench, Measurement of Power, VSWR, Frequency, Guide Wavelength,Unknown load impedance, S parameters of reciprocal and non-reciprocal devices

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3202	
Course Title: MICROWAVE ENGINEERING	
CO-1	Explain the working principle of different passive waveguide components used at microwave frequencies.
CO-2	Apply the properties of scattering matrix for solving the scattering matrix of different passive microwave components for both ideal and practical considerations and analyze their operation.
CO-3	Understand the conceptual and operational characteristics of different microwave Tube circuits
CO-4	Explain the operational characteristics of different microwave solid state devices.
CO-5	Understand and implement different experimental procedures involving measurement of microwave parameters

SYLLABUS: VLSI DESIGN (B17 EC 3203)
(Common to ECE & EEE (Open Elective))

UNIT-I: Introduction:

Introduction to IC Technology, Fabrication process: NMOS, PMOS and CMOS .I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans conductance, Output Conductance and Figure of Merit. NMOS Inverter, Pull-up to Pull- down Ratio for NMOS inverter driven by another NMOS Inverter, and through one or more pass transistors, Alternative forms of pull-up, The CMOS Invertor, Latch-up in CMOS circuits, Comparison between CMOS and Bi-CMOS technology.

UNIT-II: MOS and Bi-CMOS Circuit Design Processes:

MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal, DoublePoly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Translation to Mask Form.

UNIT-III: Basic Circuit Concepts:

Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Choice of layers

Scaling of MOS Circuits: Scaling models, Scaling factors for device parameters, Limits due to sub threshold currents, current density limits on logic levels and supply voltage due tonoise and current density. Switch logic, Gate logic.

UNIT-IV: Test and Testability:

Design for Testability, Practical design for Test (OFT) Guidelines, Scan Design Techniquesand Built-In-Self Test.

FPGA Based Systems: Introduction, Basic concepts, FPGA architecture.

UNIT-V: Introduction to Low Power VLSI Design:

Introduction to Deep submicron digital IC design, Low power CMOS Logic circuits: Over view of power consumption, Low –Power design through voltage scaling, Estimation andoptimization of switching activity, Reduction of switching capacitance, interconnect Design, Power Grid and Clock Design.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3203	
Course Title: VLSI DESIGN	
CO-1	Apply the Concept of design rules during the layout of a circuit.
CO-2	Model and simulate digital VLSI systems using hardware design language.
CO-3	Synthesize digital VLSI systems from register-transfer or higher level descriptions
CO-4	Understand current trends in semiconductor technology, and how it impacts scaling and performance.
CO-5	Understand the basic concepts of FPGA and low power VLSI design

SYLLABUS: DIGITAL SIGNAL PROCESSING (B17 EC 3204)

UNIT-I: Discrete-Time Signals and Systems: (Oppenheim & Proakis)

Introduction to Digital Signal Processing, Basic elements of a DSP system, Advantages of Digital SP over Analogy SP, Discrete-time signals and systems, DT-LTI systems describedby Linear constant–coefficient difference equations, Properties & Analysis of DT-LTI systems, Discrete linear convolution, Frequency domain representation of DT Signals and Systems, DTFT, Review of the Z-transform, Properties, Inverse Z-transform, Analysis of DT-LTI systems in Z-Domain, System function, One-sided Z-transform, Solution of difference equations, Structures and Realization of Digital Filters, Direct-I, II, series and parallel forms.

UNIT-II: Discrete Fourier Transform (DFT) and Fast Fourier Transform Algorithms (FFT): (Oppenheim &Proakis)

Frequency analysis of discrete time signals, DFS, Properties of DFS, Sampling of DTFT, DFT, Properties of DFT, Circular and linear convolution of sequences using DFT, Efficient computation of DFT, Radix–2 Decimation–in–Time(DIT) & Decimation–in–Frequency(DIF)FFT Algorithms, Inverse FFT.

UNIT-III: Design of IIR Digital Filters: (Oppenheim &Proakis)

General considerations in Filter design, Analog filter approximations– Butterworth and Chebyshev, Frequency response specifications; Design of IIR digital filters from analog filters, Bilinear Transformation Method, Impulse Invariance Technique, and Low-pass filter Design examples.

UNIT-IV: Design of FIR Digital Filters: (Oppenheim &Proakis)

Characteristics of FIR Digital Filters, Design of Linear Phase FIR digital Filters using Windows, Effect of Window selection & filter length on filter frequency response, Design examples, Comparison of IIR and FIR Filters.

UNIT-V: DSP Applications and Fundamentals of Multirate Digital Signal Processing: (SK Mitra)

Overview of DSP applications, Spectral analysis of sinusoidal signals using FFT, Sub bandcoding of speech signals, Signal compression, Finite precision arithmetic effects.

Introduction to Multirate DSP, Basic sampling rate alteration devices: up sampler, down sampler, Time and Frequency domain characterization of up/down samplers, Interpolator and decimator. Interactive programing based examples.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 EC 3204	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Describe the DSP fundamental theory and components, Develop an understanding of DSP advantages, limitations and fundamental tradeoffs. Carry-out LTI system analysis using convolution & Z-transform
CO-2	Carryout data analysis &spectrum analysis using FFT
CO-3	Design of IIR digital filters to meet specifications
CO-4	Design of FIR digital filters to meet specifications
CO-5	Knows multi-rate signal processing aspects & DSP applications

SYLLABUS: RADAR ENGINEERING (B17 EC 3205)

UNIT-I: AN INTRODUCTION TO RADAR:

Origin of Radar, Basic Principle of Radar, Range to a target, Pulse Repetition Frequency and Range Ambiguities, Radar Block Diagram and Operation, Radar Equation, Integration of Radar Pulses ,Probability of Detection and Probability of False Alarm, CW Radar andapplications, Radar Antenna Parameters, System Losses and Propagation Effects, Applications of Radar.

UNIT-II: MTI AND PULSE DOPPLER RADAR:

Pulse Doppler Radar, Butterfly effect, Coherent and Non Coherent Moving Target Indication Radar, Delay line Cancellers, Limitation to MTI performance, Moving target Detector, MTI from moving platform

UNIT-III: TRACKING RADAR:

Types of Tracking Radars, Sequential Lobing, Conical Scan, Monopulse tracking Radar, Lowangle tracking, Synthetic Aperture Radar (SAR), Active and Passive Aperture Phased array Radars,. MST Radar, ECM, ECCM

UNIT-IV: RADAR TRANSMITTERS&RECEIVERS:

Noise Figure and Noise Temperature, Types of Duplexers, Types of Mixers, Radar Displays, Receiver Protectors, Match Filter & Antennas

UNIT-V: FUNDAMENTALS OF NAVIGATIONAL AIDS:

Principles of Direction Finders, Sense Finders, VOR, Aircraft Homing and ILS, RadioAltimeter, LORAN and NDB.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3205	
Course Title: RADAR ENGINEERING	
CO-1	Able to understand the basic working principles of various Radars.
CO-2	Apply various mathematical equations to measure the Range and angle information of the targets from the radar.
CO-3	Analyze and design of radar signals, MTI, Pulse Doppler radar and various tracking Radars
CO-4	Analyze various Radar systems, advantages, limitations and their applications.
CO-5	Analyze various Navigational Aids like LORAN, DECCA and VOR.

SYLLABUS: MICROCONTROLLERS (B17EC3206)
(Open Elective)

UNIT-I: Introduction to 8051

Microprocessors and Microcontrollers, RISC & CISC CPU Architectures, Harvard & Von- Neumann CPU architecture. 8051Microcontroller: Introduction, Architecture of 8051, Pin diagram of 8051, Memory organization, External Memory interfacing, stacks.

UNIT-II: Addressing modes and Instruction set:

Introduction, Instruction syntax, Data types, Subroutines, Addressing modes, Assemblerdirectives, Instruction set, Instruction timings, example programs in assembly language.

UNIT-III: 8051 Interrupts and Timers/counters:

Basics of interrupts, 8051 interrupt structure, Timers and Counters, 8051 timers/counters, special function registers, programming 8051 timers in assembly language.

UNIT-IV: 8051 Interfacing and Applications:

Basics of I/O concepts, I/O Port Operation, Interfacing 8051 to LCD, Keyboard, parallel and serial ADC, DAC, Stepper motor interfacing and DC motor interfacing and programming.

UNIT-V: 8051 Serial Communication:

Data communication, Basics of Serial Data Communication, 8051 Serial Communication, connections to RS-232, 8255A Programmable Peripheral Interface: Architecture of 8255A, I/O devices interfacing with 8051 using 8255A, Introduction to embedded C.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3206	
Course Title: MICROCONTROLLERS	
CO-1	Understand instruction execution sequence with clock.
CO-2	Gain comprehensive knowledge about architecture and addressing modes of 8051
CO-3	Learn the art of programming in assembly language for various embedded system applications.
CO-4	Develop independent learning skills to interface memory and PPI with 8051
CO-5	Create the IO interfacing techniques with 8051

OOPS THROUGH JAVA (B17CS3214)
(Common to ECE & EEE)(Open Elective)

UNIT-I:

Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM, program structure.

Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

UNIT-II:

Classes and objects, class declaration, creating objects, methods, constructors and constructoroverloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

UNIT-III:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java. lang package. Exception handling, importance of try, catch, throw, throws and finally block, user- defined exceptions, Assertions.

UNIT-IV:

Multithreading: introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data tofiles, random access file,

UNIT-V:

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling:event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons,List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3214	
Course Title: OOPS THROUGH JAVA	
CO-1	Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.
CO-2	Write, compile, execute and troubleshoot Java programming for networking concepts.
CO-3	Build Java Application for distributed environment.
CO-4	Design and Develop multi-tier applications.
CO-5	Identify and Analyze Enterprise applications

SYLLABUS: DATA MINING (B17CS3215)

(Open Elective)

UNIT –I

Introduction: Why Data Mining? What Is Data Mining? 1.3 What Kinds of Data Can Be Mined? 1.4 What Kinds of Patterns Can Be Mined? Which Technologies Are Used? Which Kinds of Applications Are Targeted? Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity

UNIT –II

Data Pre-processing: Data Preprocessing: An Overview, Data Cleaning, Data Integration,Data Reduction, Data Transformation and Data Discretization

UNIT –III

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction.

UNIT –IV

Classification: Alterative Techniques, Bayes ‘Theorem, Naïve Bayesian Classification, Bayesian Belief Networks

Association Analysis: Basic Concepts and Algorithms: Problem Defecation, Frequent ItemSet generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm. (Tan &Vipin)

UNIT –V

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses. (Tan &Vipin)

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3215	
Course Title: DATA MINING	
CO-1	Understand stages in building a Data Warehouse
CO-2	Understand the need and importance of pre-processing techniques
CO-3	Understand the need and importance of Similarity and dissimilarity techniques
CO-4	Analyze and evaluate performance of algorithms for Association Rules.
CO-5	Analyze Classification and Clustering algorithms

SYLLABUS: INDUSTRIAL ROBOTICS (B17ME3210)

(Common to ECE & EEE)
(Open Elective)

UNIT-I

Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

UNIT – II

Components Of The Industrial Robotics: Function line diagram representation of robot arms,common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison ofElectric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – III

Motion Analysis: Homogeneous transformations as applicable to rotation and translation –problems.
Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and worldcoordinates Forward and inverse kinematics – problems.
Differential transformation and manipulators, Jacobians– problems Dynamics: Lagrange – Eulerand Newton – Euler formulations – Problems.

UNIT IV

General considerations in path description and generation. Trajectory planning and avoidanceof obstacles, path planning, Skew motion, joint integrated motion –straight line motion – Robot programming, languages and software packages-description of paths with a robot programming language..

UNIT V

Robot Actuators and Feed Back Components:
Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.
Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.
Robot Applications in Manufacturing:
Material Transfer - Material handling, loading and unloading- Processing - spot and continuousarc welding & spray painting - Assembly and Inspection.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17ME3210	
Course Title: INDUSTRIAL ROBOTICS	
CO-1	Identify various robot configuration and components,
CO-2	Select appropriate actuators and sensors for a robot based on specific application
CO-3	Carry out kinematic and dynamic analysis for simple serial kinematic chains.
CO-4	Perform trajectory planning for a manipulator by avoiding obstacles

SYLLABUS: POWER ELECTRONICS (B17EE3209)
(Open Elective)

UNIT I: MODERN POWER SEMI CONDUCTOR DEVICES

Thyristors – Silicon Controlled Rectifiers (SCRs) – BJT – Power MOSFET – Power IGBT and their characteristics. Basic theory of operation of SCR – Static characteristics and Dynamic characteristics of SCR - Turn on and Turn off times – Turn on and turn off methods. Two transistor analogy of SCR -Series and parallel connections of SCRs Snubber circuit details – Numerical problems.

UNIT II: THYRISTORFIRING AND COMMUTATIONCIRCUITS

SCR trigger circuits-R, RC and UJT triggering circuits. The various commutation methods of SCRs-Load commutation- Resonant Pulse Commutation- Complementary Commutation- Impulse Commutation- External Pulse Commutation Techniques. Protection of SCRs

UNIT III: PHASE CONTROLLED RECTIFIERS

Principles of phase controlled rectification -Study of Single phase and three-phase halfcontrolled and full controlled bridge rectifiers with R, RL, RLE loads. Effect of source inductance. Dual converters- circulating current mode and circulating current free mode- control strategies. Numerical problems.

UNIT IV: CHOPPERS, CYCLONVERTER AND AC VOLTAGE CONTROLLER

Classification of Choppers A, B, C, D and E, Switching mode regulators-Study of Buck, Boost and Buck-Boost regulators, Cu regulators. Principle of operation of Single phase bridge type Cyclo converter and their applications. Single phase AC Voltage Controllers with R and RL loads.

UNIT-V INVERTERS

Principle of operation of Single phase Inverters -Three phase bridge Inverters (180^0 and 120^0 modes)-voltage control of inverters-Single pulse width modulation- multiple pulse width modulation, sinusoidal pulse width modulation. Harmonic reduction techniques- Comparison of Voltage Source Inverters and Current source Inverters.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3209	
Course Title: POWER ELECTRONICS	
CO-1	Explain the principle of operation of thyristor, modern power semiconductor devices and necessity of series and parallel connection of thyristors.
CO-2	Explain the operation of Firing and Commutation techniques.
CO-3	Evaluate the phase controlled rectifiers with different loads.
CO-4	Analyse different Choppers, Cyclo-converter and AC voltage Controller configurations.
CO-5	Investigate harmonic reduction techniques for inverters based on PWM techniques

SYLLABUS: BIO MEDICAL ENGINEERING (B17EC3207)
(Open Elective)

UNIT-I:

Introduction to Biomedical Signals: The nature of Biomedical Signals, Examples of Biomedical Signals, Objectives and difficulties in biomedical analysis, Basic electrocardiography, ECG lead systems, ECG signal characteristics, Simple signal conversionsystems, Conversion requirements for biomedical signals, Signal conversion circuits.

UNIT-II:

Signal Averaging: Basics of signal averaging, signal averaging as a digital filter, a typical averager, software for signal averaging, limitations of signal averaging, Adaptive Principal noise canceller model, 60-Hz adaptive cancelling using a sine wave model, other applicationsof adaptive filtering.

UNIT-III:

Data Compression Techniques: Turning point algorithm, AZTEC algorithm, Fan algorithm,Huffman coding, data reduction algorithms The Fourier transform, Correlation, Convolution, Power spectrum estimation, Frequency domain analysis of the ECG.

UNIT-IV:

Cardiological signal processing: Basic Electrocardiography, ECG data acquisition, ECG lead system, ECG signal characteristics (parameters and their estimation), Analog filters, ECG amplifier, and QRS detector, Power spectrum of the ECG, Bandpass filtering techniques, Differentiation techniques, Template matching techniques, A QRS detection algorithm, Real-time ECG processing algorithm, ECG interpretation, ST segment analyzer, Portable arrhythmia monitor.

UNIT-V:

Neurological signal processing: The brain and its potentials, The electrophysiological originof brain waves, The EEG signal and its characteristics (EEG rhythms, waves, and transients), Correlation, Detection of EEG rhythms, Template matching for EEG, spike and wave detection

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3207	
Course Title: BIO MEDICAL ENGINEERING	
CO-1	Possess the basic mathematical skills necessary to analyze ECG and EEG signals.
CO-2	Possess the basic scientific skills necessary to analyze ECG and EEG signals
CO-3	Possess the basic computational skills necessary to analyze ECG and EEG signals.
CO-4	Apply classical and modern filtering and compression techniques for ECG and EEG Signals
CO-5	Develop a thorough understanding on basics of ECG and EEG feature extraction.

SYLLABUS: ARTIFICIAL NEURAL NETWORKS (B17CS3216)

(Open Elective)

UNIT-I: Basics of Artificial Neural Networks

Introduction: Biological Neural Networks, Characteristics of Neural Networks, Models ofNeuron, Topology, Basic Learning Rules

Activation and Synaptic Dynamics: Activation Dynamic Models, Synaptic Dynamic Models, Learning Methods, Stability & Convergence, Recall in Neural Networks

UNIT-II: Functional Units of ANN for Pattern Recognition Tasks: Pattern Recognitionproblem Basic Fundamental Units, Pattern Recognition Tasks by the Functional Units

Feed forward Neural Networks: Analysis of Pattern Association Networks, Analysis ofPattern Classification Networks, Analysis of Pattern Mapping Networks

UNIT-III:

Feedback Neural Networks: Analysis of linear auto adaptive feed forward networks, Analysisof pattern storage Networks, Stochastic Networks & Stimulated Annealing, Boltzmann machine

UNIT-IV:

Competitive Learning Neural Networks**:** Components of a Competitive Learning Network, Analysis of Feedback layer for Different Output Functions, Analysis of Pattern Clustering Networks and Analysis of Feature Mapping Network

Architectures for Complex Pattern Recognition Tasks**:** Associative memory, Pattern mapping Stability – Plasticity dilemma: ART, temporal patterns, Pattern visibility: Neocognitron

UNIT-V:

Applications of Neural Networks: Pattern classification, Associative memories, Optimization,Applications in Image Processing, Applications in decision making

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3216	
Course Title: ARTIFICIAL NEURAL NETWORKS	
CO-1	This Course introduces Artificial Neural Networks and Learning Rules and Learning method.
CO-2	Feed forward and Feedback Neural Networks are introduced
CO-3	Applications of Neural Networks in different areas are introduced.

SYLLABUS: MICROPROCESSORS AND MICROCONTROLLERS LAB (B17 EC 3208)

Experiments Based On ALP (8085):

1. a. Assume that byte of data is stored at memory location _X‘. Write an ALP which tests bit 5 of this data. Write _FF‘ in the location _X+1‘ if the bit 5 is _1‘ and _00‘if bit 5 is _0‘.
   b. Check the zero condition of this number and write _00‘ at location_Y‘ if it is _0‘and _FF‘ at _Y‘ if non zero.
   c. For data value in the location _X‘compute the number of logic 1‘s and store the result in the location _Y+1‘.
2. a. Write an ALP to swap the contents of location _X‘ and _X+1‘ using BC & HL Register pairs.
   b. By using above logic, write an ALP to transfer a block of data into another block.
3. a. Write an ALP to add and subtract two eight bit Number stored in the location _X‘ and _X+1‘ by assuming that content of _X‘ is greater than content of _X+1‘
   b. Modify this program to add two 16 bit numbers without using DAD instruction.
4. Two 8 bit numbers 34H and 43H are stored in locations _X‘ and _X+1‘ compute theproduct of these two numbers using
   a. Repetitive addition method b. Shift and add method
5. The number of the bytes of a block of data is in location _X‘ and data starts from location _X+1‘onwards defining a stack pointers. Write an ALP to arrange this sequence of data in reverse order. Keep the reverse sequence from _Onwards.
6. The number of bytes of a block of data is location _X‘ and data starts from location _X+1‘onwards. Arrange this block of data in ascending order by using bubble sorting technique
7. Using 8279 write an ALP to generate the message of 4 characters. Activate the LED‘s individually and make the display ON &OFF for every 0.5 seconds

Experiments Based On ALP (8086):

1. Write an 8086 ALP to addition of two-32 bit numbers stored in the memorylocation 6000H and 6004H.Store the result at location 6008H.

2. Write an 8086 ALP to Subtraction of two-32 bit numbers stored in the memory location 6000H and 6004H.Store the result at location 6008H.

3. Write an 8086 ALP to multiply two 16 bit numbers stored in the memory location 9000H and 9002H. Store the result at location 9005H.

4. Write an 8086 ALP to divide 32bit dividend with 16 bit devisor stored in the memory location 5000H and 5004H respectively. Store the quotient at 5006H and the remainder in location 5008H.

5. Write an 8086 program to add four digit BCD numbers present in memory locations 15000 H and 15002 H.Store the result at memory location 15004 H.

6. Write an 8086 program to sort the given block of data using bubble sorting technique. Assume number bytes of block of data stored in the memory location 3000H and Actual block of data starts from 3001H onwards.

Experiments based on Interfacing and Microcontroller (8051):

Programs on Data transfer instructions using 8051 Microcontroller

Programs on Arithmetic and Logical instructions using 8051 Microcontroller

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 EC 3208	
Course Title: MICROPROCESSORS AND MICROCONTROLLERS LAB	
CO-1	To become familiar with the instruction set of Intel microprocessors and microcontroller.
CO-2	To familiarize with Assembly language programming.
CO-3	The accompanying lab is designed to provide practical hands-on experience with microprocessor software applications and interfacing techniques.

SYLLABUS: VLSI LAB (B17EC3209)

List of Experiments:

1. Design and implementation of an inverter
2. Design and implementation of universal gates (NAND, NOR)
3. Design and implementation of AND, OR gates
4. Design and implementation of EXOR gate using minimum no. of transistors
5. Design and implementation of 2 to 1 Multiplexer
6. Design and implementation of full adder
7. Design and implementation of full subtractor
8. Design and implementation of D-latch
9. Design and implementation 3-bit asynchronous counter
10. Design and Implementation of static 1-bit RAM cell

Equipment Required:

1. Mentor Graphics/Cadence tools software-latest version
2. Personal computer with necessary peripherals.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EC3209	
Course Title: VLSI LAB	
CO-1	Learn the work flow of mentor graphic tools/Cadence tools for logic gates, Combinational and Sequential circuits.
CO-2	Simulate combinational and sequential circuits with EDA tools
CO-3	Acquire Knowledge of analysis of combinational and sequential circuits using CMOS 130nm Technology
CO-4	Acquire practical experience in drawing layouts using Cadence/Mentor Graphics CAD tools.

SYLLABUS: EMPLOYABILITY SKILLS (B17BS32010)
(Common to all Branches)
Part-A: Verbal Aptitude and Soft Skills-II

UNIT -I (VA)

Sentence Improvement (finding a substitute given under the sentence as alternatives), Sentence equivalence (completing a sentence by choosing two words either of which will fit in the blank), cloze test (reading the written discourse carefully and choosing the correct options from the alternatives and filling in the blanks), summarizing and paraphrasing.

UNIT- II (VA)

Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the authors intention of writing a passage), strategies for quick reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

UNIT- III (VA)

Punctuation, discourse markers, general Essay writing, writing Issues and Arguments(with emphasis on creativity and analysis of a topic), paragraph writing, preparing reports, framinga _Statement of purpose_, _Letters of Recommendation_, business letter writing, emailwriting, writing letters of complaints/responses. Picture perception and description, book review.

UNIT-IV (VA)

Just a minute sessions, reading news clippings in the class, extempore speech, telephone etiquette, making requests/suggestions/complaints, elocutions, debates, describing incidents and developing positive nonverbal communication, story narration, product description.

UNIT-V (SS)

Employability Skills – Significance — Transition from education to workplace - Preparing a road map for employment – Getting ready for the selection process, Awareness about Industry / Companies – Importance of researching your prospective workplace - Knowing about Selection process - Resume Preparation: Common resume blunders – tips, Resume Review, Group Discussion: Essential guidelines – Personal Interview: Reasons for Rejection and Selection

Part-B: Quantitative Aptitude-II

UNIT I: Averages, mixtures and allegations, Data interpretation Understanding of AM, GM,HM-Problems on averages, Problems on mixtures standard method. Importance of data interpretation: Problems of data interpretation using line graphs, Problems of data interpretation using bar graphs, Problems of data interpretation using pie charts, Problems of data interpretation using others.

UNIT II: Puzzle test, blood Relations, permutations, Combinations and probability Importance of puzzle test, Various Blood relations-Notation to relations and sex making of family Tree diagram, Problems related to blood relations, Concept of permutation and combination, Problems on permutation, Problems on combinations, Problems involving both permutations and combinations, Concept of probability-Problems on coins, Problems on dice, Problems on cards, Problems on years.

UNIT III: Periods, Clocks, Calendars, Cubes and cuboids Deriving the formula to find the angle between hands for the given time, finding the time if the angle is known, Faulty clocks, History of calendar-Define year, leap year, Finding the day for the given date, Formula and method to find the day for the given date in easy way, Cuts to cubes, Colors to cubes, Cuts to cuboids, Colors to cuboids.

UNIT IV: Puzzles Selective puzzles from previous year placement papers, sitting arrangement, problems-circular arrangement, linear arrangement, different puzzles.

UNIT V: Geometry and Mensuration Introduction and use of geometry-Lines, Line segments, Types of angles, Intersecting lines, Parallel lines, Complementary angles, supplementary angles, Types of triangles-Problems on triangles, Types of quadrilaterals- Problems on quadrilaterals, Congruent triangles and properties, Similar triangles and its applications, Understanding about circles-Theorems on circles, Problems on circles, Tangents and circles, Importance of mensuration-Introduction of cylinder, cone, sphere, hemi sphere.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3201	
Course Title: EMPLOYABILITY SKILLS	
Part-A (Verbal Aptitude and Soft Skills-II)	
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign Universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, and respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.
Part-B (Quantitative Aptitude-II)	
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skillfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangular, volume of cone, cylinder and so on.

SYLLABUS: ADVANCED CODING (B17 BS 3203)
(Common to ECE & EEE)

UNIT I Review Coding essentials and modular programming

Introduction to Linear Data, Structure of linear data, Operation logics, Matrix forms andrepresentations, Pattern coding.

Introduction to modular programming: Formation of methods, Methods: Signature anddefinition, Inter-method communication, Data casting & storage classes, Recursions

UNIT II Linear Linked Data

Introduction to structure pointer, Creating Links Basic problems on Linked lists, Classical problems on linked lists. Circular Linked lists, Operations on CLL, Multiple links, Operationson Doubly linked lists

UNIT III Abstract Data-structures

Stack data-structure, Operations on stack, Infix/Prefix/Post fix expression evaluations, Implementation of stack using array, Implementation of stack using linked lists.

Queue data-structure: Operations on Queues, Formation of a circular queue, Implementation of queue using stack, Implementation of stack using array, Implementation of stack using linked lists

UNIT IV Running time analysis of code and organization of linear list data

Code evaluation w.r.t running time, Loop Complexities, Recursion complexities, Searching techniques: sequential Vs. binary searching.

Organizing the list data, Significance of sorting algorithms, Basic Sorting Techniques: Bubble sort, selection sort, Classical sorting techniques: Insertion sort, Quick sort, Merge sort.

UNIT V Standard Library templates and Java collections

Introduction to C++ language features, working on STLs, Introduction to Java as ObjectOriented language, Essential Java Packages, Coding logics.

Note: This course should focus on Problems

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3203	
Course Title: ADVANCED CODING	
CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

IPR & PATENTS (B17BS3206)
(Common to CSE, ECE & IT)

UNIT I

Intellectual Property Law: Basics - Types of Intellectual Property - Innovations and Inventions - Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Compliance and Liability Issues

UNIT II

Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership–Copyright Formalities and Registration – Limitations – Infringement of Copyright - Plagiarism and difference between Copyright infringement and Plagiarism

UNIT III

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures Trade Mark maintenance– Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT IV

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent Patent Infringement and Litigation – International Patent Law – Double Patenting

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3206	
Course Title: IPR & PATENTS	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

ELECTRICAL AND ELECTRONICS ENGINEERING

Regulation: R17				I / IV - B.Tech. I - Semester					
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS1101	English – I	BS	3	3	1	--	30	70	100
B17 BS1102	Mathematics – I	BS	3	3	1	--	30	70	100
B17 BS1105	Engineering Chemistry	BS	3	3	1	--	30	70	100
B17 ME1101	Engineering Mechanics	ES	3	3	1	--	30	70	100
B17 ME1102	Engineering Drawing	ES	3	1	--	3	30	70	100
B17 CE1101	Environmental Studies	ES	2	2	1	--	30	70	100
B17 BS1107	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100
B17 BS1108	English Communication Skills Lab – I	BS	2	--	--	3	50	50	100
B17 BS1109	Engineering Workshop & IT Workshop	BS	2	--	--	3	50	50	100
B17 BS1111	Inner Engineering	BS	--	--	--	2	--	--	--
Total			**23**	**15**	**5**	**14**	**330**	**570**	**900**

ELECTRICAL & ELECTRONICS ENGINEERING
SYLLABUS: ENGLISH – I (B17 BS 1101)

(Common to all Branches)

Life through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I

People and Places:-Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types-Describing people, places and events-Writing sentences-Self-awareness- Self-motivation, Dialogue writing.

UNIT-II

Personality and Lifestyle: - Word quiz – Verbs-Adverbs-Negotiations-Proving yourself- Meeting Carl Jung-Describing yourself- Living in the 21st century- Using your dictionary- Communication-Adaptability.

UNIT-III

Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User's Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue-Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

UNIT-IV

Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewingemployees- Your first interview-Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V

Work and Business:- A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The InsideStory*, Mark Zuckerberg: World's Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business- Recession-Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1101	
Course Title: ENGLISH – I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS – I (B17 BS 1102)

(Common to all Branches)

UNIT I: Differential equations of first order and first degree:

Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Newton's Law of cooling, Law of natural growth and decay, orthogonaltrajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, $xV(x)$, Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:

Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplacetransforms.

UNIT IV: Partial differentiation:

Introduction, Homogeneous functions, Euler's theorem, Total derivative, Chain rule, whichvariable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign.

Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange's method (with constraints)

UNIT V: First order and higher order partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit"s method). Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type e^{ax+by}, sin (ax+by), cos (ax+by), x^my^n.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS – I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions.
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jocobian and maxima/minima of functions of two variables.
CO-6	Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

SYLLABUS: ENGINEERING CHEMISTRY (B17 BS 1105)

(Common to CIV, EEE & ME)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination of Calorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann's by-product coke oven process; Refining of Petroleum, Knocking- octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG, CNG.

Lubricants: - Definition, Mechanism of Lubrication, Properties of Lubricants (Definition and significance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion- material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electrroless plating ; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boilertroubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials

Cement: - Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refactories.Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi-Conductors, Classification and chemistry of semiconductors:

Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1105	
Course Title: ENGINEERING CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly students understand liquid crystals and semi-conductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: NGINEERING MECHANICS (B17 ME 1101)
(Common to CIV, EEE & ME)

UNIT-I

Basic Concepts:

Scalar and vector quantities- Representation of vectors- Free vector force, Specification of force- Effect of force on rigid body- Free body diagram. Concurrent Forces in a plane: Principles of statics-Resolution and Composition of forces in a plane-Equilibrium of concurrent forces in a plane- Method of projections- Equilibrium of three forces in a plane Method of moments. Parallel Force system in a plane.

UNIT-II

Centroid & Moment of Inertia: Centroid & M.I – Arial & Mass M.I – Radius of Gyration, Parallel axis–Perpendicular axis theorem – Simple Problems.

UNIT-III

General Case of Forces in a Plane: Resultant and equilibrium of general case of forces in a plane, statically determinate plane trusses-Method of joints and Method of sections.

Friction – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.

UNIT-IV

Dynamics of Particles - Rectilinear Motion – Kinematics, D'Alembert's principle, Kinetics –Work & Energy – Impulse Moment, Direct Central Impact – coefficient of restitution.

Curvilinear Motion – Kinematics, Projectile Motion, Moment of momentum, Work & Energy in Curvilinear motion.

UNIT-V

Dynamics of Rigid Bodies - Rigid body rotation – Kinematics - Kinetics – Work & Energy in Rigid body rotation, Plane Motion – Kinematics – Instantaneous center of rotation, Kinetics - Work-Energy principle in plane motion.

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1101	
Course Title: ENGINEERING MECHANICS	
CO-1	Determine the resultant of the given force systems.
CO-2	Analyze force systems using equations of equilibrium.
CO-3	Determine centroid, center of gravity and moment of inertia of areas and bodies.
CO-4	Analyze trusses and simple beams.
CO-5	Distinguish between kinematics and kinetics.
CO-6	Apply the work energy and impulse momentum methods of various engineering problems.

SYLLABUS: ENGINEERING DRAWING

(B17 ME 1102)

(Common to CIV, EEE & ME)

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

UNIT III

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views toisometric views.

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1102	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

SYLLABUS: ENVIRONMENTAL STUDIES

(B17 CE 1101)

(Common to all Branches)

UNIT – I

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

Ecosystems:

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers and Decomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems Desert Ecosystems and Aquatic Ecosystems

UNIT-II

Biodiversity:

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

UNIT-III

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture. Forest Resources: Use and over exploitation-Mining and Dams-their effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

UNIT-IV

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India:

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcityand Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

UNIT-V

Institutions and Governance:

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

SYLLABUS: ENGINEERING CHEMISTRY LAB (B17 BS 1107)
(Common to CIV, EEE & ME)
LIST OF EXPERIMENTS

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by $KMnO_4$.
4. Estimation of oxalic acid by $KMnO_4$
5. Estimation of Mohr"s salt by $K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler"s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1107	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- I (B17 BS 1108)
(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: ENGINEERING WORKSHOP & IT WORKSHOP (B17 BS 1109)

(Common to CIV, EEE & ME)

Carpentry	**Fitting**
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

PART-A ENGINEERING WORKSHOP

Note: At least two exercises to be done from each trade.

PART B: IT WORKSHOP:
LIST OF EXCERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.
3. MS-Office / Open Office

   a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
   b) Spread Sheet - organize data, usage of formula, graphs, charts.
   c) Power point - features of power point, guidelines for preparing an effective presentation.
   d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette,cyber hygiene.

6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1109	
Course Title: ENGINEERING WORKSHOP & IT WORKSHOP	
	PART-A (ENGINEERING WORKSHOP)
CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.
	PART-B (IT WORKSHOP)
CO-1	Understand the basic components and peripherals of a computer.
CO-2	To become familiar in configuring a system.
CO-3	Learn the usage of productivity tools.
CO-4	Acquire knowledge about the netiquette and cyber hygiene.
CO-5	Get hands on experience in trouble shooting a system

SYLLABUS:INNER ENGINEERING(B17 BS 1111)
(Common to CIV, EEE & ME)

UNIT-I

YES! + Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in thepresent Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

UNIT-II

YES! + Workshop:

Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management –Happiness point – Opposite Values – Pranayama – Sudarshan kriya

UNIT-III

YES! + Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing

Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life –Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

UNIT-IV

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

UNIT -V

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – PublicSpeaking – Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1111	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Regulation: R17					I / IV - B.Tech. II- Semester				
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS1201	English – II	BS	3	3	1	--	30	70	100
B17 BS1202	Mathematics – II	BS	3	3	1	--	30	70	100
B17 BS1203	Mathematics – III	BS	3	3	1	--	30	70	100
B17 BS1204	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS1201	Computer Programming Using C	ES	3	3	1	--	30	70	100
# DS 1	Department Subject	ES	3	3	1	--	30	70	100
B17 BS1206	Engineering PhysicsLab	BS	2	--	--	3	50	50	100
B17 BS1208	English Communication Skills Lab – II	BS	2	--	--	3	50	50	100
B17 CS1204	C Programming Lab	ES	2	--	--	3	50	50	100
B17 BS1210	Engineering PhysicsVirtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS1211	NCC	BS	--	--	--	2	--	--	--
Total			**24**	**18**	**6**	**13**	**330**	**570**	**900**

#DS 1	CIVIL	B17 CE 1201	Building Materials and Construction
	EEE	B17 EE 1201	Circuit Theory
	MECHANICAL	B17 EE 1202	Basic Electrical and Electronics Engineering

ELECTRICAL & ELECTRONICS ENGINEERING

SYLLABUS: ENGLISH – II (B17 BS 1201)

(Common to all Branches)

UNIT I:

Detailed-Text: Unit 1:'

1. The Greatest Resource- Education'
2. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from the Great Indian Scientists.

UNIT II:

Detailed-Text: Unit 2:'

1. A Dilemma'
2. Non-Detailed Text: Lesson 2:'C V Raman' from the Great Indian Scientists.

UNIT III:

1. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments
2. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from the Great Indian Scientists.

UNIT IV:

1. Detailed-Text: Unit 4: 'The Lottery'
2. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from the Great Indian Scientists.

UNIT V:

1. Detailed-Text: Unit 5: ' The Chief Software Architect'
2. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from the Great Indian Scientists

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS: MATHEMATICS – II (B17 BS 1202)

(Common to CIV, EEE & ME)

UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backwarddifferences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton"s formulae for interpolation, Interpolation with unequal intervals, Lagrange"s interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule, Simpson"s $1/3^{rd}$ and $3/8^{th}$ rules, Solution of ordinary differential equations by Taylor series method, Picard"s method of successive approximations, Euler"s method, Runge-Kutta methods (second order and fourth order).

UNIT IV: Fourier series:

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet"s conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval"sformula.

UNIT V: Fourier Transforms:

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval"s identities, Finite Fourier transforms.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1202	
Course Title: MATHEMATICS – II	
CO-1	Find a real root of algebraic and transcendental equations using different methods
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson"s rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: MATHEMATICS – III (B17 BS 1203)

(Common to all Branches)

UNIT I: Linear systems of equations:

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.

Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.

Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.

Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

UNIT IV: Vector Differentiation:

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector

Integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green"s, Stokes" and Gauss divergence theorems.

ENGINEERING PHYSICS (B17 BS 1204)

(Common to CIV, EEE & ME)

UNIT I: Interference and Diffraction

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton‟s rings-Michelson‟s interferometer. Fraunhoffer‟s diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers

Introduction, Spontaneous emission and Stimulated emission – Einstein‟s relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle- Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

UNIT- III: Electro Magnetic Fields and Ultrasonics

Concept of Electromagnetic induction , Faraday‟s law, Lenz‟s law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere‟s law, Maxwell‟s equations and their significance (withoutderivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function- significance-Schrodinger‟s time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands ofcrystalline solids-Distinction between Conductors, Semi-conductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC, FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg‟s law.

Introduction to Nano materials – Synthesis methods: Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

(Note: Assignment Marks of Engineering Physics are to be considered from the internal marks of Engineering Physics-- Virtual Labs – Assignments B17 BS 1210)

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1204	
Course Title: ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonic"s as a tool for technological applications
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C (B17 CS 1201)
(Common to CIV, EEE & ME)

UNIT I: Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts.

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing (vi/emacs editor), Compiling (gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators,conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples,Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation

POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:

Objective: Understanding miscellaneous aspects of C

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration,definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, type def, bit-fields, program applications

BIT-WISE OPERATORS: logical, shift, rotation, masks. Objective: Comprehension of file operations FILEHANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1201	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference
CO-6	Understand the dynamics of memory by the use of pointers
CO-7	Use different data structures and create/update basic data files.

SYLLABUS: BUILDING MATERIALS AND CONSTRUCTION
(B17 CE 1201)
(For CIVIL)

UNIT I: STONES, BRICKS AND CLAY PRODUCTS

Stones: Classification of stones, Properties of building stones, Stone quarrying, precautions in blasting **Bricks:** Classification of Bricks, Manufacture of Bricks, general qualities of Bricks as per IS code, tests for good bricks as per IS code, including field tests. **Clay Products:** Tiles-types,manufacturing and their uses, Earth-wares, Terra-cotta, stone ware, Porcelain.

UNIT II: WOOD, WOOD BASED PRODUCTS

Wood: cross section details of trees, their general properties, characteristics of good timber defects in timber, mechanical properties of timber, seasoning and its importance, Decay of timber, **Wood based Products:** Veneers, Plywood and its types, Manufacturing of plywood, plywood grades as per IS code, Laminated wood, merits of plywood and laminated wood, LaminBoards, Block boards, Batten board, Particle boards

UNIT III: LIME, CEMENT & AGGREGATES

Lime: Various ingredients of lime, Constituents of lime stone, classification of lime , **Cement:** Natural and artificial cements, types of artificial cements and their uses, Wet and dry process of manufacturing ordinary Portland cement (OPC), composition of cement, Various fieldand Laboratory tests on OPC as per IS code, Storage of cement. **Aggregates:** Classification of aggregate – Coarse and fine aggregates, Particle shape and Texture, Specific gravity, Bulk density, porosity and Absorption, Moisture content of Aggregate – Bulking of sand, Sieve analysis.

UNIT IV: FINISHINGS, MASONRY AND FOUNDATIONS

Finishing's: Paints and Varnishes: Constituents and characteristics of paints, types of paint and their uses, Painting defects, causes and remedies. Constituents of varnishes, types of varnish and their uses, Pointing and Plastering. **Masonry:** Different types of Stone Masonry- Plan, Elevation,Sections of stone Masonry works- Brick Masonry- Different Types of Bonds- Plan, Elevation and section of Brick Bonds upto Two-Brick wall thickness- Partition walls- Different types of Block Masonry- Hollow concrete Blocks- FAL-G Blocks, Hollow Clay Blocks. **Foundations:** Types- strip, isolated, strap, combined footings, Raft-Mat- flat slab and Beam raft, box type raft.

UNIT V: ROOFING, FORM WORK & SCAFFOLDING

Roofing: Mangalore tiled roof, RCC roof, Madras terrace roof, Hollow tiled roof, Asbestos cement, Fibre glass, Aluminum G.I. Sheet roofing's. **Form work, Scaffolding:** form work- types of formwork, centering-scaffolding-types of scaffolding. Trusses: Types- King post and queen post trusses and their uses. Stair cases: Various types of stair cases- dog legged, quarter landing, spiral stairs etc.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1201	
Course Title: CIRCUIT THEORY	
CO-1	Various electrical networks in presence of active and passive elements.
CO-2	Electrical networks with network topology concepts.
CO-3	Magnetic circuit with various dot conventions.
CO-4	R, L, C network with sinusoidal excitation.
CO-5	Three phase AC circuits.

SYLLABUS: CIRCUIT THEORY (B17 EE 1201)
(For EEE)

UNIT-I: Introduction to Electrical Circuits:

Passive components and their V-I relations. Sources (dependent and independent) -Kirchhoff"slaws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta- to-star transformation). Source transformation technique, nodal analysis and mesh analysis.

UNIT-II: Network topology:

Definitions of Graph and Tree, Basic cut set and tie set matrices for planar networks, Loop andnodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

UNIT-III: Magnetic Circuits:

Basic definition of MMF, flux and reluctance. Analogy between electrical and magneticcircuits. Faraday"s laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling and composite magnetic circuit. Analysis of series and parallel magnetic circuits.

UNIT-IV: Single Phase A.C Systems:

Periodic waveforms (determination of rms, average value and form factor).Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance - Real, Reactive, Apparent and Complex power. Node and mesh analysis of AC networks, Series and parallel resonance. Numerical problems.

UNIT-V: Three Phase Circuits:

Advantages of Three Phase Circuits, Balanced and Unbalanced systems, Relation between Line and Phase Quantities in Star and delta connected circuits, Analysis of Balanced & Unbalanced Three Phase Circuits.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1201	
Course Title: CIRCUIT THEORY	
CO-1	Various electrical networks in presence of active and passive elements.
CO-2	Electrical networks with network topology concepts.
CO-3	Magnetic circuit with various dot conventions.
CO-4	R, L, C network with sinusoidal excitation.
CO-5	Three phase AC circuits.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B17 EE 1202)
(For ME)

UNIT I: Electrical and Magnetic Circuits:

Basic definitions, Types of network elements, Ohm"s Law, Kirchhoff"s Laws, Series and parallelCircuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday"s laws, Lenz"s law, statically induced EMF, dynamically induced EMF.

UNIT-II: DC Machines:

Principle of operation of DC generator- EMF equation-Types of DC Generators-DC motorTypes-Torque equation-Applications-Swinburne"s Test, Speed control methods.

UNIT-III: Transformers:

Principle of operation of Single phase Transformers- EMF equation-losses-OC and SC Tests- Efficiency and Regulation.

UNIT-IV: AC Machines:

Principle of operation of three phase Induction motor-Slip-Torque characteristics-Efficiency- applications-Principle of operation of Alternator-EMF equation, Regulation of alternator by synchronous Impedance method.

UNIT-V: Diodes-Rectifiers and Transistors:

PN junction diode-Forward bias and reverse bias operation, V-I characteristics-Diodeapplications (Half wave, Full wave and bridge rectifier), Zener diode.

PNP and NPN junction Transistors, Transistor as an amplifier, single stage CE amplifier,Frequency response of CE amplifier.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1202	
Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	
CO-1	Able to analyze the various Electrical networks and understand the basics of Magnetic Circuits.
CO-2	Able to understand the operation of DC generators, 3-Point starter and conduct the Swinburne"s test.
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motors and alternator.
CO-5	Able to analyze the operation of Half-wave and Full-wave rectifiers and single stage CE amplifier.

SYLLABUS: ENGINEERING PHYSICS LAB (B17 BS 1206)

(Common to CIV, EEE & ME)

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LIST OF EXPERIMENTS

(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton"s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde"s experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee"s apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young"s modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck"s constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1206	
Course Title: ENGINEERING PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the Instruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- II(B17 BS 1208)
(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: C PROGRAMMING LAB (B17 CS 1204)
(Common to CIV, EEE & ME)
List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs

b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man

c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

1. Write a C Program to Simulate 3 Laws at Motion
2. Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

1. Write a C Program to Find Whether the Given Year is a Leap Year or not.
2. Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

1. Write a C Program to Find Whether the Given Number is
   i. Prime Number
   ii. Armstrong Number
2. Write a C program to print Floyd Triangle
3. Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

1. Write a C Program demonstrating of parameter passing in Functions and returning values.
2. Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

1. Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Usingswitch…case
2. Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.
b) Sorting-Bubble, Selection.
c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure
b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer
b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

1. Implementation of string manipulation operations **with** library function.
    i) copy
    ii) concatenate
    iii) length
    iv) compare

2. Implementation of string manipulation operations **without** library function.
    1. copy
    2. concatenate
    3. length
    4. compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.
b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.
b) Write a C program to delete a file.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)
b) The Lab record must be a print of the LATEX (.tex) Format.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1204	
Course Title: C PROGRAMMING LAB	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software

SYLLABUS: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS (B17 BS 1210)

(Common to CIV, EEE & ME)

List of Experiments

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster"s angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson"s interferometer
13. Black body radiation

URL: www.vlab.co.in

(Note: Internal Marks of Engineering Physics - Virtual Labs – Assignments are to be considered as Assignment marks in the Internal Marks of Engineering Physics- B17 BS 1204)

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1210	
Course Title: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS	
CO	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

NCC (B17 BS 1211)
(Common to CIV, EEE & ME)

The NCC- National Integration and Awareness- Drill- Personality Development Life Skills- Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

(**Note**: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17									II / IV - B.Tech. I- Semester
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS2101	Mathematics - IV	BS	3	3	1	--	30	70	100
B17 EC2101	Electronics Devices &Circuits	ES	3	3	1	--	30	70	100
B17 EE2101	Network Analysis andSynthesis	ES	3	3	1	--	30	70	100
B17 EE2102	Electro Magnetic FieldTheory	ES	3	3	1	--	30	70	100
B17 EE2103	Electrical Measurements & Instruments	ES	3	3	1	--	30	70	100
B17 BS2104	Engineering Economics	BS	3	3	1	--	30	70	100
B17 EE2105	Networks & Measurements Lab	ES	2	--	--	3	50	50	100
B17 EC2105	Electronics Devices &Circuits Lab	ES	2	--	--	3	50	50	100
B17 BS 2106	Programming Skills-I	BS	1	--	--	2	50	---	50
B17 BS2107	English Proficiency-I	BS	--	1	1	--	--	--	--
B17BS 2108	Professional Ethics &Human Values	BS	--	2	--	--	--	--	--
Total			**23**	**21**	**7**	**8**	**330**	**520**	**850**

ELECTRICAL & ELECTRONICS ENGINEERING

SYLLABUS: MATHEMATICS IV (B17BS2101)

(Common to CE, ECE, EEE& ME)

UNIT-I Functions of a Complex Variable

Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n , e^z, sin z, sinh z and log z (no questions may be set).

Limit and continuity of a function of the complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, finding an analytic function, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: the transformations defined by w = z+c, w = cz, w = 1/z, the Bilinear transformation, w = z^2 and w=e^z.

UNIT-II Applications of Partial Differential Equations

Method of separation of variables, One –dimensional wave equation, the D‟Alembert‟s solution, one-dimensional heat equation, two-dimensional heat flow in steady state (solution of two- dimensional Laplace equation in Cartesian coordinates only)

UNIT-III Difference Equations And Z-Transforms

Formation of a difference equation, Rules for finding complimentary function and particular integral for linear difference equations.

Definition of Z- transform, some standard Z- transforms, properties, transform of a function multiplied by n, initial value theorem and final value theorem(without proof), evaluation of inverse Z- transforms, convolution theorem (without proof), solution of linear difference equations by the use of Z- transforms.

UNIT-IV Probability Distributions

Binomial distribution, Poisson distribution, Normal distribution: Definition (pmf/pdf), notation, mean, variance, moment generating function, probability generating function and fitting of a distribution.

UNIT-V Sampling Theory

Sampling theory: Sampling distribution, standard error, testing of Hypothesis, level of significance, confidence limits, simple sampling of attributes, sampling of variables, estimation of mean and variance.

Large samples: testing of hypothesis for sample proportion, two proportions, single mean and two means.

Small samples: Degrees of freedom, Students‟ t- distribution, t-test for single mean, two means; Chi-squared distribution-testing the goodness of a fit.

Course Outcomes for Second Year First Semester Course	
Course Code: B17BS2101	
Course Title: MATHEMATICS IV	
CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.

SYLLABUS: ELECTRONIC DEVICES AND CIRCUITS (B17 EC 2101)
(Common to ECE & EEE)

UNIT-I: Transport Phenomena in Semi-Conductors

Mobility and conductivity, intrinsic and extrinsic semiconductors, mass action law, charge densities in a semiconductors, Hall Effect, generation and recombination of charges, drift and diffusion currents, the continuity equation, injected minority carrier charge, potential variation in graded semiconductors.

UNIT- II: PN junction diode and Diode Rectifiers

Open circuited PN junction , PN junction as a rectifier, current components in a PN diode, V-I characteristics and its temperature dependence, transition capacitance, charge control description of a diode, diffusion capacitance, junction diode switching times, Zener diode, Tunnel Diode, Photo diode, Varactor diode, LED,Half wave, Full wave and Bridge Rectifiers with and without filters, Ripple factor and regulation characteristics

UNIT – III: Bipolar junction transistors

Introduction to BJT, operation of a transistor and transistor biasing for different operatingconditions, transistor current components, transistor amplification factors: α,β,γ relation between α and β,γ early effect or base-width modulation, common base configuration and its input and output characteristics, common emitter configuration and its input and output characteristics, common collector configuration and its input and output characteristics, Comparison of CE, CB and CC Configurations, Break- down in transistors, Photo Transistor.

Transistor Biasing Circuits: The operating point, Bias stability, different types of biasing techniques, stabilization against variation in I_{co} , $V_{BE,}$ & β. Bias compensation, thermal runaway,thermal stability.

UNIT – IV: Field Effect transistors

JFET and its characteristics, pinch off voltage, FET small signal model, MOSFET and itscharacteristics, Biasing of FETs.

UNIT – V: Transistors at low and high frequencies

Transistor hybrid model, H-parameters, Analysis of transistor amplifier circuits using h- parameters, comparison of transistor amplifier configurations, analysis of single stage amplifier, effects of bypass and coupling capacitors, frequency response of CE amplifier, Emitter follower, High frequency model of transistor.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 CE 2101	
Course Title: ELECTRONIC DEVICES AND CIRCUITS	
CO-1	Understand the physical structure, principles of operation, electrical characteristics and circuit models of diodes, BJT‟s and FET‟s.
CO-2	Use the concepts of semiconductor physics and electronic devices to design and fabricate simple electronic circuits.
CO-3	Use this knowledge to analyze and design amplifier circuits and oscillator circuits to be used in various applications.
CO-4	Extend the understanding of how electronic circuits and their functions fit into larger electronic systems.

SYLLABUS: NETWORK ANALYSIS AND SYNTHESIS (B17EE2101)

UNIT-I: Network theorems

Linearity and Superposition theorem, Thevenin‟s theorem, Norton‟s theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman‟s theorem, Tellegen‟s theorem and Compensation theorem.

UNIT-II DC Transients

Inductor, Capacitor, Source free RL, RC and RLC Response, Evaluation of Initial conditions, application of Unit-step Function to RL, RC and RLC Circuits(Differential equations), Concepts of Natural, Forced and Complete Response.

UNIT-III Laplace Transform Techniques

Transforms of Typical Signals, Response of Simple Circuits to Unit – Step, Ramp and Impulse Functions, Initial and Final Value Theorem, Convolution Integral, Time Shift and PeriodicFunctions, Transfer Function

UNIT-IV Two Port Networks

Two port network parameters – Z, Y, ABCD and Hybrid parameters andInterrelationship between different parameters.

UNIT-V Network Functions & Synthesis

Network Functions, Concept of Poles and Zeroes, Restriction of Poles and Zeroes for Driving pointand transfer function, Hurwitz Polynomial.

Positive real function - basic synthesis procedure - Foster and Cauer forms ofLC, RCand RL networks.

Course Outcomes for Second Year First Semester Course	
Course Code: B17EE2101	
Course Title: NETWORK ANALYSIS AND SYNTHESIS	
CO-1	Students will learn the theorems for Analyzing complex networks.
CO-2	Students will outline the significance of energy storing elements (Inductance &Capacitance) in circuits and study transient behavior of responses.
CO-3	Students will learn to apply Laplace transform technique for circuit analysis and know its advantages.
CO-4	Students will learn to apply two-port network analysis for devices like amplifiers, transmission lines.
CO-5	Students will learn to apply the concept of positive real functions and the synthesis procedure for RC, LC, RL & RLC networks.

SYLLABUS: ELECTRO MAGNETIC FIELD THEORY (B17EE2102)

UNIT I

Coordinate systems:

Rectangular, cylindrical and spherical coordinate systems.

Electrostatics:

Coulomb‟s law and superposition principle, different types of charge configurations, electric flux, electric field intensity and electric flux density, electric field intensity and electric flux density due to different charge configurations, Gauss‟s law in integral form and point form in terms of D, applications of Gauss' law, Divergence theorem.

UNIT II

Electric potential, calculation of electric potential for giving charge configuration, electrostatic energy, Electrostatic boundary conditions, basic properties of conductors in electrostatic fields, capacitance, Poisons and Laplace‟s equations, solutions of Laplace‟s equations, uniquenesstheorems, methods of images, electric dipoles, polarization of dielectrics, bound charges.

UNIT III

Magneto statics:

Biot-savart‟s law, determination of magnetic field intensity and magnetic flux density due to various steady current configurations, continuity equation, curl of *H*, Ampere‟s circuital law in integral and differential form,

Applications of Ampere‟s law, Stokes theorem.

UNIT IV

The scalar and vector magnetic potential and calculation of magnetic field through the vector magnetic potential for given steady current configurations, magnetostatic boundary conditions.

The magnetic dipole, magnetization, properties of magnetic materials, torques and forces on magnetic dipoles, bound current, Faraday‟s laws, Lenz‟s law, inductance and energy in magneticfields.

UNIT V

Time varying fields and Maxwell's equations:

Lorentz force equation, Maxwell‟s equations, modification of ampere‟s circuital law for time varying fields – displacement current and current density, the uniform plane wave, plane wave propagation, phase velocity and wavelength, intrinsic impedance, attenuation, phase and propagation constants, skin depth, the poynting vector, poynting theorem and power considerations.

Course Outcomes for Second Year First Semester Course	
Course Code: B17EE2102	
Course Title: ELECTRO MAGNETIC FIELD THEORY	
CO-1	Find the electrostatic and magneto static fields for different configurations.
CO-2	Apply various principles and laws to estimate the effect of electric and magnetic fields.
CO-3	Distinguish between the effects of electrostatic and magneto static fields.
CO-4	Apply Maxwell's equations for static and time varying fields.
CO-5	Analyze the EM wave in different domains and compute average power density

SYLLABUS: ELECTRICAL MEASUREMENTS & INSTRUMENTS (B17EE2103)

UNIT-I: Philosophy of measurement

Methods of measurement, measurement system, classification of instrument system, characteristics of instruments & measurement system, errors in measurement & its analysis, standards.

UNIT-II: Analog measurement of electrical quantities

Moving coil, moving iron, Electrodynamometer type, electrostatic and induction type instruments, electro dynamic wattmeter, three phase wattmeter, power in three phase system, errors & remedies in wattmeter and energy meter. Extension of instrument range, introduction to measurement of frequency and power factor.

UNIT-III: Measurement of parameters

Different methods of measuring low, medium and high resistances, measurement of inductance& capacitance with the help of AC bridges. DC potentiometers and its applications. AC potentiometer - types & applications.

UNIT-IV: Magnetic measurement

Ballistic galvanometer, flux meter, determination of B-H curve and hysteresis loop, measurementof iron losses, current transformers and potential transformers, application of CRO inmeasurement of B-H curve.

UNIT-V: Digital measurement of electrical quantities

Digital Instruments, Concept of digital measurement, Analog to digital & Digital to analog conversion, advantages of digital Instruments, digital display units, Resolution in digital meters, sensitivity& Accuracy of digital meters.

Course Outcomes for Second Year First Semester Course	
Course Code: B17EE2103	
Course Title: ELECTRICAL MEASUREMENTS & INSTRUMENTS	
CO-1	Illustrate the characteristics of measuring instruments(K3)
CO-2	Discriminate measuring instruments based on their principle & operation (K4)
CO-3	Calculate power and energy in 1Ø,3Ø&poly phase circuits (K3)
CO-4	Measure electrical parameters using a bridge(K3)
CO-5	Find magnetic measurements using Ballistic Galvanometers and Flux meters.(K4)

SYLLABUS: ENGINEERING ECONOMICS (B17BS2104)

UNIT-I

Introduction to Economics: Wealth, Welfare and Scarce Definitions of Economics; Micro & Macro Economics.

Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of demand – Meaning, types, Significance of Elasticity of Demand, Measurement of price Elasticity of Demand. Need for Demand forecasting, forecasting techniques.

UNIT-II

Cost Analysis: Classification of cost, Elements of cost, Methods of costing (Job costing, Processcosting & Unit costing).

Break-Even Analysis (BEA): Determination of Break-Even Point, Assumptions and Applications.

UNIT-III

Market Structures: Features and price determination under Perfect competition, Monopoly, Monopolistic competition and Oligopoly.

Pricing practices: Price - meaning, methods of pricing.

UNIT-IV

Economic Systems: Features and Evaluation of Capitalism, Socialism and Mixed Economy.

Business cycles: Meaning, Phases, Causes & theories of Business Cycle.

UNIT-V

Depreciation and Financial Accounting: Depreciation-causes and methods (straight line method, diminishing balance method).

Final Accounts: Preparation of Trading Account, Profit & Loss Account and Balance sheet.

Course Outcomes for Second Year First Semester Course	
Course Code: B17BS2104	
Course Title: ENGINEERING ECONOMICS	
CO-1	Provide detailed insight about origin & definitions of economics & enlighten the students about demand analysis.
CO-2	Illustration about applications of cost Concepts & analysis of breakeven point.
CO-3	Understand about various types of Market Structure and Pricing practices implemented by the organization.
CO-4	Infuse knowledge about different Economic systems & Business cycles.
CO-5	Enlighten the students regarding the aspects of Depreciation & Financial Accounting.

SYLLABUS: NETWORKS & MEASUREMENTS LAB (B17EE2105)

LIST OF EXPERIMENTS

1. Verification of Ohms Law and resistance of a filament Lamp

2. Verification of superposition theorem

3. Verification of The vinen‟s theorem

4. Verification of Norton‟s theorem

5. Verification of maximum power transfer theorem

6. Series resonance

7. Calculation two port network parameters

8. Calibration of wattmeter

9. Calibration of energy meter

10. Three voltmeter method

11. Measurement of 3 phase power using two wattmeter method

12. Parameters of choke coil.

13. Measurement of three phase power by using 2 C.T‟s and Single Wattmeter

14. Crompton's DC potentiometer

15. Kelvin's double bridge16.Schering bridge

Course Outcomes for Second Year First Semester Course	
Course Code: B17EE2105	
Course Title: NETWORKS & MEASUREMENTS LAB	
CO-1	Students will gain the skill to make and experiment with practical electric circuits.
CO-2	Students will be able to measure voltage, current, power in practical electric circuits.
CO-3	Students will know the significance of various theorems and their applications.
CO-4	Students will be able to assess the behavior of electric circuits.
CO-5	Students will be able to calibrate single phase energy meter, voltmeter &wattmeter
CO-6	Students will be able to measure resistance, inductance &capacitance.

SYLLABUS: ELECTRONICS DEVICES AND CIRCUITS LAB (B17 EC 2105)
(Common to ECE & EEE)

ELECTRONIC WORKSHOP PRACTICE

1. Identification ,Specifications and testing Of R,L,C components, colour codes,potentiometers, coils and bread boards
2. Identification, Specifications and testing of devices like diodes, BJTs, JFETs, SCR and UJT.
3. Soldering of Simple Circuits using Active &Passive Components.
4. Study and operation of Transformers, Ammeters(Analog & Digital),Voltmeters(Analog &Digital) , Analog and Digital Multimeters and Function Generators, Regulated PowerSupply, Decade Resistance, Inductance &Capacitance Boxes And CRO.

LIST OF HARDWARE EXPERIMENTS**:**

1. V-I Characteristics Of Semiconductor Diode (Ge& Si), LED and Zener Diode
2. Half Wave And Full Wave Rectifier With And Without Filter
3. Characteristics Of BJT In CE Configuration
4. JFET Characteristics
5. Transistor Biasing Circuits And Transistor As Switch
6. CE Amplifier
7. JFET Common Source Amplifier

LIST OF SIMULATION EXPERIMENTS

1. Simulation of V-I Characteristics Of Semiconductor Diode, LED and Zener Diode
2. Simulation of Regulation Characteristics Of ZENER Diode
3. Simulation of CC Amplifier
4. Simulation of JFET Characteristics
5. Simulation of BJT Characteristics In CB Configuration
6. Simulation of JFET Amplifier
7. Simulation of UJT Characteristics

NOTE: (Minimum of Twelve Experiments Should Be Conducted)

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EC 2105	
Course Title: ELECTRONICS DEVICES AND CIRCUITS LAB	
CO-1	Design and fabricate simple circuits like diode rectifiers with filters for providing dc voltages in electronic circuits.
CO-2	Design and fabricate amplifiers with required gain for use in various communication applications.
CO-3	Design and fabricate simple electronic circuits for everyday applications like traffic control lights using relays, automatic counters using LDRs and Burglar alarms.

PROGRAMMING SKILLS-I(B17 BS 2106)
(PYTHON)
(Common to ECE & EEE)

UNIT-I:

Overview, Environment Set Up, Basic Syntax, Identifiers, Reserved Words, Lines and Indentation, Multi-Line Statements, Quotation, Comments, Multiple Statements on a Single Line Variable Types, StandardData Types, Numbers (math, random, fraction) , Strings, Lists, Tuples , Dictionaries

UNIT-II:

Operators, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, DecisionMaking :if, if-else, nested if , Loops: for, while, nested loops

UNIT-III:

Functions, Function Arguments: Required arguments, Keyword arguments, Default arguments, Variable-length arguments, The Anonymous Functions: lambda, Scope of Variables, Modules, sys, os ,Date & Time

UNIT-IV:

Files & its operations, Exceptions, Standard Exceptions, Assertions, The try-finally Clause, Raising an Exception, User-Defined Exceptions, Classes and objects , OOPS, Data member , Function overloading, Instance variable, Inheritance, Instance, Instantiation, Operator overloading

UNIT-V:

HTML, CSS Basics, Data Base (SQLite), Database Connection, CRUD Application, CGI Architecture, WebServer Support and Configuration, GET and POST Methods, CGI Scripts.

UNIT-VI:

Project

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2106	
Course Title: PROGRAMMING SKILLS-I (PYTHON)	
CO-1	Ability to apply object oriented concepts in programming.
CO-2	Ability to define, understand and differentiate different types of data types and apply them.
CO-3	Ability to recognize various concepts of python and develops the programs using them and also develop web based application.

ENGLISH PROFICIENCY-I (B17 BS 2107)
(Common to All Branches)

UNIT-1: LISTENING

Selected Motivational Speeches

Selected Moral Stories

UNIT-2: SPEAKING

Book Review

Skit Presentation

PowerPoint Presentations

Describing event/place/thing

Extempore

Group Discussion

Picture Perception and Describing Test

UNIT-3: READING

Speeded Reading

Reading Comprehension

UNIT-4: WRITING

Paragraph Writing

Literary Appreciation – Understanding the Language of Literature

UNIT-5: PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2107	
Course Title: ENGLISH PROFICIENCY-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

PROFESSIONAL ETHICS & HUMAN VALUES (B17 BS 2108)
(Common to CIVIL, EEE & MECH)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, Human Values – Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, ProfessionalEthics
Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:

Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:

Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy,Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexual harassment at work place.

UNIT – V

Global Issues:

Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living,concept of Harmony in life.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2108	
Course Title: PROFESSIONAL ETHICS & HUMAN VALUES	
CO	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Regulation: R17				II / IV - B.Tech. II- Semester					
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17EE2201	Electrical Machines-I	ES	3	3	1	--	30	70	100
B17EE2202	Signals & Systems	ES	3	3	1	--	30	70	100
B17EC2205	Electronic Circuit Analysis	ES	3	3	1	--	30	70	100
B17ME2206	Prime movers & Pumps	ES	3	3	1	--	30	70	100
B17EC2206	Linear Integrated andPulse Circuits	ES	3	3	1	--	30	70	100
B17BS2201	Management Science	BS	3	3	1	--	30	70	100
B17ME2210	Thermal Prime Movers Lab	ES	2	--	--	3	50	50	100
B17EC2209	Linear Integrated Circuits & Pulse Digital Circuits Lab with Simulation	ES	2	--	--	3	50	50	100
B17BS2205	Programming Skills-II	BS	1	--	--	2	50	---	50
B17BS2206	English Proficiency-II	BS	--	1	1	--	--	--	--
Total			**23**	**19**	**7**	**8**	**330**	**520**	**850**

ELECTRICAL & ELECTRONICS ENGINEERING

SYLLABUS: ELECTRICAL MACHINES-I (B17EE2201)

UNIT-I: Electromechanical energy conversion:

Basic principles of energy, force and torque in singly and multiply excited systems.

UNIT-II: Transformers:

Principle, construction and operation of single phase transformers, phasor diagram, equivalent circuit, voltage regulation, losses and efficiency. Testing- open & short circuit tests, Sumpner"s test.

Autotransformers- construction, principle, applications and comparison with two winding transformer.

UNIT-III: Three phase transformer:

Construction, various types of connection and their comparative features. Parallel operation of single phase and three phase transformers. Three phase transformer connections. Scott connection, tap changing transformers- no load and on load tap changing of transformers. Cooling methods of transformers.

UNIT-IV: D.C. Machines-

Working principle, construction and methods of excitation. D.C generators emf equation, armature reaction, commutation. Compensating winding, characteristics of various types ofgenerators, applications. D.C. motors- torque equation, D.C. shunt, series and compound motors

– Characteristics& applications.

UNIT-V: Starting &Speed control-

Starting methods and speed control of D.C. shunt and series motors testing of D.C motors -direct and regenerative methods to test D.C. machines. Swinburne's test, field's test and separation of losses.

Course Outcomes for Second Year Second Semester Course	
Course Code:B17EE2201	
Course Title: ELECTRICAL MACHINES-I	
CO-1	Identify the concepts of electro mechanical energy conversion.[K2]
CO-2	Describe the concepts of construction, operating principle, different types of DC machines and transformers, effects on DC machine and parallel operation of DC generators.[K2]
CO-3	Interpret the characteristics of DC machines. [K3]
CO-4	Discriminate different types of speed control methods of DC motors. [K4]
CO-5	Examine the performance of DC machines and transformers by different testing methods.[K4]
CO-6	Discriminate different types of transformer connections[K4]

SYLLABUS: SIGNALS & SYSTEMS (B17EE2202)

UNIT I Classification of Signals & Systems:

Basic continuous time signals, basic discrete time signals transformations of independent variables, classification of systems, properties of linear time – invariant systems.

UNIT II Linear Time – Invariant (LTI) Systems:

Representation of signals in terms of impulses for discrete time and continuous time signals, convolution sum and convolution integral. Systems described by differential and difference equations. Block diagram representation of LTI systems described by differential and difference equations, singularity functions.

Analogy between vectors and signals, orthogonal vector and signal spaces. Approximation of a function by a set of mutually orthogonal functions.

UNIT III Fourier analysis:

The response of continuous time LTI systems to complex exponentials – the continuous time anddiscrete time exponential fourier series, convergence of fourier series.

UNIT IV Fourier Transform:

Fourier transform of continuous time and discrete time aperiodic signals and periodic signals. Properties of continuous time and discrete time fourier transforms. Frequency response characterized by linear constant coefficient differential and difference equations. first order and second order systems.

UNIT V: Z –transform:

Z–transform of discrete time sequence, region of convergence. Relation between Z and fourier transform, properties of z-transforms. Inverse z-transform, determination of transfer function andimpulse response of an LTI system, poles and zeros and system stability.

Sampling Theorem:

The effect of under-sampling, methods of reconstruction of a signal from samples, discrete time processing of continuous time signals.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17EE2202	
Course Title: SIGNALS & SYSTEMS	
CO-1	Characterize and analyze the properties of continuous and discrete time signals and systems. [K2]
CO-2	Apply the convolution for continuous time signals and discrete time signals.
CO-3	Evaluate the Fourier Series of periodic signals.[K1]
CO-4	Determine the Fourier Transform and Z-Transform of different types of signals and make use of their Properties.[K1]
CO-5	Convert a continuous time signal to the discrete time domain and reconstruct using the sampling theorem.[K2]

SYLLABUS: ELECTRONIC CIRCUIT ANALYSIS (B17EC2205)

UNIT – I: Multistage Amplifiers

Transistor at high frequencies, CE short circuit current gain and concept of Gain Bandwidth product. BJT and FET RC coupled amplifiers at low and high frequencies. Frequency response and calculation of Band Width of Multistage Amplifiers.

UNIT – II: Feed Back Amplifiers

Concept of Feed Back Amplifiers - Effect of Negative Feedback on the amplifier characteristics.Four feedback topologies, Method of analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers.

UNIT – III: Sinusoidal Oscillators

Condition for oscillations and types of Oscillators – RC Oscillators: RC Phase Shift and Wien bridge Oscillators. LC Oscillators: Hartley, Colpitts, Clapp, Tuned Collector and Crystal Oscillators.

UNIT – IV: Power and Tuned Voltage Amplifiers

Classification of Power Amplifiers. Series fed, Transformer coupled class-A and class-B power amplifiers. Push Pull Class-A, Class-B and Class-AB Power Amplifiers. Cross-over Distortion inPure Class-B Power Amplifier and Class-AB Power Amplifier- Trickle Bias, Derating Factor and Heat Sinks – Complementary Push Pull Amplifier. Analysis of Single tuned, double tuned and Stagger Tuned Amplifiers with gain and Bandwidth Calculations.

UNIT – V: Operational Amplifiers

Concept of Differential Amplifier. Differential Amplifier supplied with a constant current source. Calculation

of common mode rejection ratio. Block diagram and Ideal characteristics of an Op-Amp. Applications of Op-Amp: Inverting and Non-Inverting amplifiers, Integrator, Differentiator, Summing, Subtracting and Logarithmic Amplifiers. Definition and Measurement of OP-Amp Parameters.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17EC2205	
Course Title: ELECTRONIC CIRCUIT ANALYSIS	
CO-1	Know the equivalent circuit of multistage amplifier and its analysis.[K3]
CO-2	Identify the different feedback topologies and analyze them.[K1]
CO-3	Explain the principle of oscillator and design different types of sinusoidal oscillators.[K3]
CO-4	Define the difference between voltage and power amplifiers and design different classes and know that Tuned amplifiers amplify a narrow band of frequencies and will also be able to analyze them.[K1,K2,K3]
CO-5	Identify that Op-amp not only amplifies but also performs different operations and analyze some of its applications.[K1,K2]

SYLLABUS: PRIME MOVERS & PUMPS (B17ME2206)

UNIT-I I.C Engines:

Classification, working principles – valve and port timing diagrams – air standard cycles :otto, diesel -P-V and T-S diagram ,thermal efficiency– Engine systems line fuel injection, carburetion, ignition, cooling. Engine performance evaluation.

UNIT-II Properties of Steam and use of Steam Tables:

T-S and H-S Diagrams. Analysis of Various Thermodynamic Processes under gone by Steam. Vapor Power Cycles: Carnot Cycle-Rankine Cycle- Thermodynamic Variables Effecting Efficiency and output of Rankine Cycle-. Analysis of simple Rankine Cycle and Re-heat cycle.

UNIT- III Gas Turbines:

Simple gas turbine plant-ideal cycle, closed cycle -open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle. Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating Steam Turbines: Classification of Steam Turbines Impulse Turbine and Reaction Turbine- Compounding in Turbines- Velocity Diagrams for simple Impulse and Reaction Turbines- Workdone & efficiency

Part-B: Hydro prime movers

UNIT-IV Impact Of Jets And Pumps:

Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved).

PUMPS: Types of pumps, Centrifugal pumps: Main components, Working principle, Multi stage pumps, Performance and characteristic curve

UNIT-V: Hydraulic Turbines:

Classification of turbines; Working principle, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17ME2206	
Course Title: PRIME MOVERS & PUMPS	
CO-1	Understand the concepts of hydrodynamic force of jets on stationary and moving flat inclined and curved vanes.
CO-2	Apply the concepts of momentum equation for finding the forces acting on the vanes of the turbines.
CO-3	Calculate the performance of different types of internal combustion engines.
CO-4	Apply the otto, Diesel cycles for finding the performance of S.I and C.I engines. Understand the working principle of steam turbines and gas Turbines.
CO-5	To impart the knowledge of various types of pumps, their constructional features, working and performance.
CO-6	To impart the knowledge of various types of turbines and the performance characteristics of hydraulic turbines

SYLLABUS: LINEAR INTEGRATED AND PULSE CIRCUITS (B17EC2206)

UNIT-I: Applications of Operational Amplifiers:

Basics of Op-Amp, Instrumentation Amplifiers, Voltage to Current and Current to Voltage Converters. Op-amp As a Comparators, Schmitt trigger, Wave form Generators, Sample and Hold Circuits, Rectifiers.

UNIT-II: Active Filters and Oscillators:

Butterworth type LPF, HPF first and second order filters, Switched Capacitance Filters. Op-AmpPhase Shift, Wein-bridge and Quadrature Oscillator, Analog Multiplexers.

UNIT-III: Special ICs:

555 Timers Introduction, Block diagram, 555 timer as a Stable and Mono stable Multi vibrator,Three Terminal IC Regulators, Voltage to Frequency and Frequency to Voltage Converters.

UNIT-IV: Wave Shaping:

High pass and Low pass RC circuits, Response of High pass and Low pass RC circuits to step, square inputs.

High pass RC circuit as a differentiator, Low pass RC circuit as an integrator. Diode clippers, Clipping at two independent levels, Clamping Operation, Clamping Circuits using Diode with Different Inputs, Clamping Circuit Theorem, Practical Clamping circuits.

UNIT-V: Multi vibrators:

Transistor as a switch, switching times of a transistor, Design and Analysis of Fixed-bias and self-bias transistor binary, Commutating capacitors, Design and analysis of Collector coupled Mono stable Multi vibrator, Expression for the gate width and its waveforms. Design and analysis of Collector coupled A stable Multi vibrator, Expression for the Time period and its waveforms, The A stable Multi vibrator as a voltage to frequency converter.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17ME2210	
Course Title: LINEAR INTEGRATED AND PULSE CIRCUITS	
CO-1	Understand the applications of Op-amps
CO-2	Design different active filters and oscillators
CO-3	Understand the applications of 555 Timers and IC regulators
CO-4	Understand the applications of integrator, differentiator, clippers and clamper circuits.
CO-5	Design different multi vibrators for various applications.

SYLLABUS: MANAGEMENT SCIENCE (B17 BS 2201)
(Common to ECE & EEE)

UNIT-I: Introduction to Management

Concept, Nature and importance of Management, Functions of management, Evolution ofManagement thought, Fayol"s principles of Management, Theories of Motivation, Decision making process.

UNIT-II: Marketing Management

Concept, Functions of marketing, Marketing Mix, Marketing strategies based on Product life cycle, Channels of distribution.

UNIT-III: Human Resource Management (HRM)

Concepts of HRM, Personal Management and Industrial Relations, Basic functions of HR Manager-Man power planning, Recruitment, Selection, Placement, Training, Development, Compensation and Performance Appraisal.

UNIT-IV: Production Management

Production planning &control (PPC), Objectives, Functions, Stages of PPC, Plant location (SiteSelection).

Financial Management

Types of capital- Fixed and Working Capital, Methods of Raising finance. Long-term, Medium-term and Short-term financial sources.

UNIT-V: Strategic Management

Vision, Mission, Goals, objectives, policy, strategy, Elements of corporate planning process, Environmental scanning, SWOT analysis Steps in strategy formulation and implementation of Generic strategy alternatives

Course Outcomes for Second Year Second Semester Course	
Course Code: B17BS2201	
Course Title: MANAGEMENT SCIENCE	
CO-1	Create awareness about the concepts like Evolution of Management thought, functions & principles of management.
CO-2	Provide all round information to the students about matters related to concepts & functions related to Marketing.
CO-3	Acquire in-depth knowledge about the concepts and functions of HRM.
CO-4	Understand about aspects of Production Management and Financial Management.
CO-5	Gain knowledge about Strategy formulation & implementation, SWOT analysis in order to compete with the competition & to gain competency advantage.

THERMAL PRIME MOVERS LAB (B17ME2210)

1. Drawing of VTD for four-stroke and PTD of two-stroke engines.
2. Determination of flash and fire points
3. Determination of the kinematic and absolute viscosity of the given sample oils.
4. Load test and smoke test on I.C. engines.
5. Morse test on multi-cylinder engine.
6. Heat balance sheet on I.C. engines.
7. Study of multi-cylinder engines and determination of its firing order.
8. Economical speed test on IC engines.
9. Study on impulse and reaction turbines
10. Study on reciprocating and centrifugal pumps

Course Outcomes for Second Year Second Semester Course	
Course Code: B17ME2210	
Course Title: THERMAL PRIME MOVERS LAB	
CO-1	Explain the working principle of different types of IC Engines and illustrate the valve timing and port diagrams of an IC engines.
CO-2	Determine the viscosities of oil samples, Flash and Fire point values of fuels.
CO-3	Perform the load, Morse, Heat balance and economical speed test on IC Engines.
CO-4	Discuss the working principle of different types of hydraulic turbines
CO-5	Illustrate the working principle of centrifugal and reciprocating pumps de:

SYLLABUS: LINEAR INTIGRATED CIRCUITS & PULSE DIGITAL CIRCUTS LAB WITH SIMULATION (B17EC2209)

LIST OF EXPERIMENTS

1. Linear Wave Shaping

   a) Passive RC Differentiator

   b) Passive RC Integrator

   Non Linear Wave shaping

   c) Clipping Circuits

   d) Clamping Circuits

2. Self-bias bi stable Multi vibrator
3. Schmitt Trigger Using μA 741
4. UJT Sweep Generator
5. A stable Multi vibrator using 555 timer
6. Multiplexer
7. Shift Registers

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2205	
Course Title: PROGRAMMING SKILLS-II (JAVA)	
CO-1	Ability to define different procedural and object oriented concepts and will be able to differentiate between them.
CO-2	Ability to define, understand and differentiate different types of arrays and apply them.
CO-3	Ability to recognize various concepts of java and develops the programs using them.
CO-4	Ability to identify and differentiate the various features of AWT components to construct container based programs.
CO-5	Ability to describe and explain the concept of networking.

SYLLABUS: LIST OF EXPERIMENTS
(Simulation)

1. Linear Wave Shaping
   a) Passive RC Differentiator
   b) Passive RC Integrator

2 Non Linear Wave shaping
   a) Clipping Circuits
   b) Clamping Circuits
3. Self-bias bi stable Multi vibrator
4. Schmitt Trigger Using µA 741
5. UJT Sweep Generator
6. A stable Multi vibrator using 555 timer.
7. Multiplexer
8. Shift Registers

PROGRAMMING SKILLS-II (B17 BS 2205)
(JAVA)
(Common to ECE & EEE)

UNIT-I:

Overview, Environment Set Up, Basic Syntax, Identifiers, Reserved words, Data Types, Literals, Basic Operators

UNIT-II:

Control Statements in Java: if...else statement, for, while, do-while, for-each, Nested for loops, switch, break, continue, return, Objects & Classes, Access Specifiers, Input & Output, Arrays, Strings

UNIT-III:

Methods, Relationship between objects, Object-Oriented Programming: Encapsulation, Abstraction, Inheritance, Polymorphism, Interfaces, Type Casting, Packages

UNIT-IV:

Exception Handling: try, catch, final, finally, throw, throws, Built-in, User-defined Exceptions,Files: Read, Write and Append operations using text streams & byte streams

UNIT-V:

Collection Framework, Generics

UNIT-VI:

Threads: life cycle, single tasking, multi-tasking, Deadlocks, Thread Priorities, Daemon Threads,Serialization

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2205	
Course Title: **PROGRAMMING SKILLS-II (JAVA)**	
CO-1	Ability to define different procedural and object oriented concepts and will be able to differentiate between them.
CO-2	Ability to define, understand and differentiate different types of arrays and apply them.
CO-3	Ability to recognize various concepts of java and develops the programs using them.
CO-4	Ability to identify and differentiate the various features of AWT components to construct container based programs.
CO-5	Ability to describe and explain the concept of networking.

ENGLISH PROFICIENCY-II (B17 BS 2206)
(Common to All Branches)

UNIT-1: SPEAKING

Analyzing proverbs

Enactment of One-act play

UNIT-2: READING

Reading Comprehension

Summarizing Newspaper Article

UNIT-3: WRITING

Note Taking &Note Making

Precis Writing

Essay Writing

Letter Writing

Picture Description

Literary Appreciation– Learning the Language of Literature

UNIT-4: VOCABULARY

Indian-origin English Words

Phrasal Verbs for Day-to-Day Communication

Commonly used Idiomatic Expressions

UNIT-5: PROJECT

Research Writing

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 BS 2107	
Course Title: ENGLISH PROFICIENCY-II	
CO-1	Develop the skills of taking and making notes.
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively.
CO-4	Learn and practice the skills of Research writing.
CO-5	Communicate well through various forms of writing.
CO-6	Be confident in giving presentations and dealing with people.

Regulation: R17				III / IV - B.Tech. I- Semester					
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	Name of the Subject	Category	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
B17 EE3101	Electrical Machines-II	ES	3	3	1	--	30	70	100
B17 EE3102	Microprocessor & Microcontroller	ES	3	3	1	--	30	70	100
B17 EE3103	Electrical Power Generation, Transmission & Distribution	ES	3	3	1	--	30	70	100
B17 EE3104	Control Systems	ES	3	3	1	--	30	70	100
B17 EE3105	Digital Electronics & Logic Design	ES	3	3	1	--	30	70	100
B17 EE3106	Non-Conventional Energy Sources	ES	3	3	1	--	30	70	100
B17 EE3107	Electrical Machines Lab-I	ES	2	--	--	3	50	50	100
B17 EE3108	Microprocessor & Microcontroller Lab	ES	2	--	--	3	50	50	100
B17 BS3101	Problem Solving & Linguistic Competence	BS	1	--	3	--	30	70	100
B17 BS 3102	Basic Coding	BS	1	--	--	3	50	50	100
B17 BS 3105	IPR & Patents	BS	--	--	2	--	--	---	--
Total			**24**	**18**	**11**	**9**	**360**	**640**	**1000**

ELECTRICAL & ELECTRONICS ENGINEERING

SYLLABUS: ELECTRICAL MACHINES-II (B17EE3101)

UNIT-I BASIC CONCEPTS OF ELECTRICAL MACHINES:

Physical arrangement of windings in stator and cylindrical rotor; slots for windings; single turn coil - active portion and overhang; full-pitch coils, concentrated winding, distributed winding, winding axis, generated emf, Air-gap MMF distribution with fixed current through winding - concentrated and distributed, Sinusoidally distributed winding, winding distribution factor

UNIT-II INDUCTION MACHINES

Construction, Types (squirrel cage and slip-ring), Equivalent circuit. Phasor Diagram, Torque Slip Characteristics, Starting and Maximum Torque. Losses and Efficiency. Circle Diagram. Effect of parameter variation on torque speed characteristics (variation of rotor resistance). Methods of starting, braking and speed control for induction motors. Generator operation. Self-excitation. Doubly-Fed Induction Machines.

UNIT-III SINGLE PHASE INDUCTION MOTORS

Constructional features, double revolving field theory, equivalent circuit, determination of parameters. Split phase starting methods & applications.

UNIT-IV SYNCHRONOUS GENERATORS

Constructional features, Cylindrical rotor machines, Synchronous Generator-circuit modeland phasor diagram, armature reaction, synchronous impedance, voltage regulation and estimation of voltage regulation by EMF, MMF and ZPF methods, Salient pole Machine-Two reaction theory, analysis of phasor diagram, power angle characteristics, determination of x_d and x_q, Parallel operation of Alternators-Synchronization and load division.

UNIT-V SYNCHRONOUS MOTORS

Operating principle, circuit model, phasor diagram, effect of load, Operating characteristicsof synchronous machines, V-curves, starting methods of synchronous motors.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3101	
Course Title: ELECTRICAL MACHINES-II	
CO-1	Understand the concepts of construction, operating principle and starting methods of AC machines.
CO-2	Perform various tests on AC Machines
CO-3	Analyze the performance of different AC machines in the concepts of torque and power factor correction.

SYLLABUS: MICROPROCESSOR & MICROCONTROLLER (B17EE3102)

UNIT-I 8085 MICROPROCESSOR:

Introduction to microprocessors, microcomputers – Architecture of 8085 microprocessor – pin-out diagram of 8085 – Detailed description of the 8085 pins – addressing modes Memory interfacing – Machine cycles and bus timings for Opcode fetch, memory read,memory write, I/O read, I/O write operations – Memory mapped I/O and I/O mapped I/O.

UNIT-II 8085 INSTRUCTIONS AND PROGRAMMING:

Difference between Machine language, Assembly language and High level language – Brief description of the 8085 instruction set – 8085 programming using data transfer group, arithmetic group, logical group, branch transfer group, stack and subroutines – counters and delay .

UNIT-III INTERFACING PERIPHERALS TO 8085:

Function of D/A and A/D converters – Interfacing D/A and A/D converters. Detailed description and interfacing of 8251 USART, 8253/8254 programmable timer, 8255 PPI, 8257 DMA controller, 8279 programmable keyboard/display interface

UNIT-IV 8051 MICROCONTROLLER:

Introduction to microcontrollers – Comparison between microprocessors and microcontrollers – Functional block diagram of 8051 microcontroller and its description – 8051 pin-out diagram and description of 8051 pins – Interfacing external memory to 8051 – implementing counters and timers in 8051 – Serial data transfer using 8051 – Variousinterrupts and its programming in 8051. Interfacing Stepper motor to 8051 microcontroller.

UNIT-V ADVANCED TOPICS IN MICROPROCESSORS:

Architecture of 8086 microprocessor pin out diagram – Addressing modes – differencesbetween 8085 and 8086.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3102	
Course Title: MICROPROCESSOR & MICROCONTROLLER	
CO-1	Understand the fundamentals of 8085 Microprocessor and microcontroller based systems.
CO-2	Familiarize with the instruction set and assembly level programming.
CO-3	Illustrate how the different peripherals (8255, 8253etc.)
CO-4	Distinguish and analyze the properties of Microprocessors &Microcontrollers.
CO-5	Apply knowledge on interfacing microcontrollers for some real time applications.

SYLLABUS: ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION (B17EE3103)

UNIT-I ELECTRIC POWER GENERATION& ECONOMIC CONSIDERATIONS:

Layout of thermal, hydro, nuclear and gas power plants, brief description of various parts of different power plants. Load curves and associated definitions, load duration curves, differenttypes of tariffs and examples.

UNIT-II POWER SUPPLY SYSTEMS& DISTRIBUTION SYSTEMS:

Transmission and distribution systems- D.C 2-wire and 3- wire systems, A.C single phase, three phase and 4-wire systems, comparison of copper efficiency. Primary and secondary distribution systems, concentrated & uniformly distributed loads on distributors fed at both ends, ring distributor, voltage drop and power loss calculation, Kelvin‟slaw.

UNIT-III INDUCTANCE & CAPACITANCE CALCULATIONS:

Types of conductors, line parameters, calculation of inductance and capacitance of single and double circuit transmission lines, three phase lines with bundle conductors. Skin effect and proximity effect.

UNIT-IV PERFORMANCE OF TRANSMISSION LINES:

Generalized network constants and equivalent circuits of short, medium, long transmission line. Line performance: regulation and efficiency, Ferranti effect.

UNIT-V OVERHEAD LINE INSULATORS:

Types of insulators, potential distribution over a string of suspended insulators, methods of equalizing potential.
Corona: phenomenon of corona, corona loss, concept of radio interference.
MECHANICAL DESIGN OF TRANSMISSION LINES:
Different types of tower, sag –tension calculations, sag template, string charts.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3103	
Course Title: ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION	
CO-1	Describe the power generation from different energy sources.
CO-2	Demonstrate different tariffs of generation, Inductance & Capacitance of transmission lines.
CO-3	Analyze the various transmission and distribution systems under various conditions.

SYLLABUS: CONTROL SYSTEMS (B17EE3104)

UNIT I:

Introduction to control systems- Open loop and closed loop systems- Transfer Functions of Linear Systems– Impulse Response of Linear Systems – Mathematical Modeling of Physical Systems – Equations of Electrical Networks – Modeling of Mechanical Systems – Equations of Mechanical Systems, Analogous Systems.

UNIT II:

Block Diagrams of Control Systems – Signal Flow Graphs (Simple Problems) – Reduction Techniques for Complex Block Diagrams and Signal Flow Graphs (Simple Examples)-Feedback Characteristics of Control Systems

UNIT III:

Time Domain Analysis of Control Systems – Time Response of First and Second Order Systems with Standard Input Signals – Steady State Error Constants – Effect of Derivative and Integral Control on Transient and Steady State Performance of Feedback Control Systems.

UNIT IV:

Concept of Stability– Routh-Hurwitz Criterion, Relative Stability Analysis, the Concept and Construction of Root Loci, Analysis of Control Systems with Root Locus (Simple Problems to understand theory).

UNIT V:

Frequency Domain Analysis of control systems - Bode Plots- Log Magnitude versus Phase Plots- Polar Plots - Correlation between Time and Frequency Responses - Nyquist Stability Criterion -Assessment of Relative Stability -All Pass and Minimum Phase Systems - Constant M and N Circles.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3104	
Course Title: CONTROL SYSTEMS	
CO-1	Model electrical and mechanical physical systems by applying laws of physics
CO-2	Represent mathematical models of systems using block diagrams & Signal Flow Graphs and derive their transfer functions
CO-3	Analyze systems in time domain for transient and steady-state behavior
CO-4	Learn the concept of stability and use RH criterion and Root locus methods for stability analysis.
CO-5	Learn to obtain frequency response plots of systems and use them for system analysis and stability assessment.

SYLLABUS: DIGITAL ELECTRONICS AND LOGIC DESIGN (B17EE3105)

UNIT I NUMBERING SYSTEMS: Digital systems - Binary, Octal, Decimal and Hex numbering systems – Number base Conversions – (n-1)"s and n"s complements of the variousnumbering systems – Binary arithmetic – Various methods to represent signed binary numbers. Binary Codes: BCD, Excess-3 codes – Binary arithmetic using BCD and Excess-3 codes – Gray code – Error detecting codes: parity checking and Hamming code – Error correcting codes: Hamming code

UNIT II BOOLEAN ALGEBRA AND BOOLEAN FUNCTIONS: Boolean theorems and postulates – Logic gates – Truth table - Boolean functions – Dual of a function – Complement of a function – Canonical and standard forms – Simplification of Boolean functions using Boolean theorems and postulated, Karnaugh map (K-map) with maximum of 4 variables

UNIT III COMBINATIONAL LOGIC CIRCUITS: Boolean function implementationusing AND-OR logic, multilevel NAND and multilevel NOR implementation – Transformation of multilevel NAND and NOR circuits to AND-OR diagram – Combinational logic design - Half adder – Full adder – Half subtractor – Full subtractor – Parallel adder – Parallel adder/subtractor –Carry look ahead adder – BCD adder – Magnitude comparator –code converters, Decoders – Encoders – De multiplexer – Multiplexer – Logic implementation using Programmable Logic Devices.

UNIT IV SEQUENTIAL LOGIC CIRCUITS: Differences between combinational logic and sequential logic – Flip-flops (R-S, J-K, D, T, Master-slave J-K flip-flop) – Truth tables and excitation tables of the flip-flops, Conversions of flip-flops. Digital Counters-Ripple Counter design, Synchronous Counter design with T, D and J.K. Flip-flops. Shift Registers and Operation Modes.

UNIT V REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS:
AND, OR and NOT Gates using Diodes and Transistors, RTL, DTL, TTL and CML Logic Families and its Comparison.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3105	
Course Title: DIGITAL ELECTRONICS AND LOGIC DESIGN	
CO-1	Understand the concepts of basic number system and Boolean
CO-2	Apply the Boolean algebra for framing the simplified expression.
CO-3	Analyze the combinational & sequential circuits using simple logic gates and PLD & PLA.

SYLLABUS: NON-CONVENTIONAL ENERGY SOURCES (B17EE3106)

UNIT-I:

Introduction to Non-Conventional Energy Sources:

Environmental aspects of conventional electric energy generation, renewable and non- conventional energy sources, impact of renewable energy generation on environment, prospects of renewable energy sources.

UNIT-II:

Solar Energy:

Solar radiation and its measurements: introduction to solar energy, solar constant, solarradiation at the earth"s surface, solar radiation geometry, solar radiation measurements,estimation of average solar radiation, solar radiation on tilted surface. Solar energy collectors:physical principles of the conversion of solar radiation into heat, flat plate collectors, concentrating collectors, advantages and disadvantages. Solar electric power generation: principles of solar photo-voltaic cells, conversion efficiency and power output.

UNIT-III:

Wind Energy:

Introduction, basic principles of wind energy conversion-nature of wind, power in the wind, maximum power, forces on the blades, lift and drag forces, aerodynamics, types of wind power plants, types of wind turbine - generating units, generating systems, energy storage, application of wind energy, site selection considerations, environmental aspects.

UNIT-IV:

Ocean Energy: Ocean thermal energy conversion: working principle, availability, types, advantages, limitations and applications. Wave energy: factors affecting the wave energy, mathematical analysis for potential energy, kinetic energy, total energy and wave power.Tidal energy: basic terminology, types of tidal plants, energy potential estimation from a tidalplant, advantages and limitations.

UNIT-V:

Geo-Thermal Energy: Structure of earth's interior, thermal gradient, geo-thermal energy sources, types of geo-thermal power generation, merits, demerits and applications of geo- thermal energy.

Bio Energy: Overview, bio-mass conversion processes, bio-gas generation, factors affecting the generation of bio gas, various types of bio gas plants.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3106	
Course Title: NON-CONVENTIONAL ENERGY SOURCES	
CO-1	Identify the need for Renewable energy
CO-2	Recognize the ways of collection of solar energy.
CO-3	Apply the knowledge of wind energy to estimate the energy potential.
CO-4	Apply the knowledge of ocean, waves and tides to estimate their energy potential.
CO-5	Understand the concepts behind geo-thermal energy and bio energy.

SYLLABUS: ELECTRICAL MACHINES-I LAB (B17EE3107)

LIST OF EXPERIMENTS

1. Swinburne's Test
2. Speed control of a DC shunt motor.
3. Load test on DC Shunt motor.
4. Load test on DC series motor.
5. Load test on DC Compound generator.
6. Open circuit characteristics of a DC shunt generator.
7. Hopkinson's Test.
8. Internal and external characteristics of a DC shunt generator.
9. OC and SC tests on a single phase transformer.
10. Load test on a single phase transformer.
11. Sumpner's Test.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3107	
Course Title: ELECTRICAL MACHINES-I LAB	
CO-1	Analyze characteristics of various types of generators & motors which will help in Understanding of machines under various conditions.
CO-2	Compare Speed control of dc motors which will be useful in various industries.
CO-3	Determine testing of machines will given idea in testing side in various industries.

SYLLABUS: MICROPROCESSOR AND MICRO CONTROLLER LAB (B17EE3108)

LIST OF EXPERIMENTS

PART A: Experiments on Microprocessors:

1. Program to add two 8-bit binary numbers
2. Program to add an array of 8-bit binary numbers.
3. Program to pick the largest even number from an array of 8- bit binary numbers
4. Program to find the sum of an array of 2- digit packed BCD numbers.
5. Program to display decimal count from 0 to 9 with suitable delay between each count.
6. Program to convert an 8- bit binary number into BCD.
7. Program to sort given array of 8-bit binary numbers.

PART B: Experiments on Micro Controllers:

8. Microcontroller programming on two 8-bit numbers

   a) Addition,

   b) Subtraction,

   c) Multiplication

   d) Division
9. Program to obtain decimal equivalent of an 8-bit hexadecimal number
10. Interfacing stepper motor and speed control using 8051 microcontroller
11. Traffic light control using 8051 microcontroller.

Course Outcomes for Third Year First Semester Course	
Course Code: B17EE3108	
Course Title: MICROPROCESSOR AND MICRO CONTROLLER LAB	
CO-1	Evaluate the programs using basic fundamentals of 8085 Microprocessor& 8051 Microcontroller.
CO-2	Develop different programs on extended version like 8086microprocessor.
CO-3	Design programs for interfacing circuits like traffic controller, LED display board, Motor controller setc.
CO-4	Utilize their knowledge practically in PLC designs companies. Ex: Govt. sector& Private sectors

PROBLEM SOLVING & LINGUISTIC COMPETENCE (B17BS3101)
(Common to all Branches)

Part-A: Verbal and Soft Skills-I

Grammar: (VA)

Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns-number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause , conditional and relative clauses), phrases(use of the phrases,

phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees ofcomparison, modifiers, determiners, identifying errors in a given sentence, correcting errorsin sentences.

Vocabulary: (VA)

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants (with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meaningsof the same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning: (VA)

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage: (VA)

Sentence completion (with emphasis on signpost words and structure of a sentence), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:

Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis – Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for Goal Setting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - StressManagement, CV Making and CV Review

Part-B: Quantitative Aptitude –I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, Finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, introducing the concept of ratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work, Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of timeand distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.

Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships, shares and dividends Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking,directions Problems of how to find the next number in the series, Finding the missingnumber and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directions north, south, east, west.

Data sufficiency, Syllogisms Easy sums to understand data sufficiency, frequent mistakeswhile doing data sufficiency, Syllogisms Problems.

Course Outcomes for Third Year First Semester Course	
Course Code: B17BS3101	
Course Title: PROBLEM SOLVING & LINGUISTIC COMPETENCE	
	PART-A (Verbal and Soft Skills-I)
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.
CO-1	**Part-B (Quantitative Aptitude –I)**
CO-2	The students will be able to perform well in calculating on number problems and various units of ratio concepts.
CO-3	Accurate solving problems on time and distance and units related solutions.
CO-4	The students will become adept in solving problems related to profit and loss, in specific, quantitative ability.
CO-5	The students will present themselves well in the recruitment process using analytical and logical skills which he or she developed during the course as they are very important for any person to be placed in the industry.

SYLLABUS: BASIC CODING (B17BS3102)
(Common to ECE & EEE)

UNIT I Review of Programming constructs

Programming Environment, Expressions formation, Expression evaluation, Input and Output patterns, Control Structures, Sequential branching, Unconditional branching, Loop Structures, Coding for Pattern Display.

UNIT II Introduction to Linear Data, strings and pointers

Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding, Working on character data, Compiler defined methods, Substitution coding for defined methods, Row Major representation, Column Major representation, Basic searching andsorting Methods.

UNIT III Functions, Recursions and Storage Classes

Functions – Introduction to modular programming – Function Communication - Pass by value, Pass by reference – Function pointers – Recursions – Type casting – Storage classes

Practice: programs on passing an array and catching by a pointer, function returning data,comparison between recursive and Iterative solutions.

Data referencing mechanisms: Pointing to diff. data types, Referencing to Linear data,Runtime-memory

Allocation, Named locations vs pointed locations, referencing a 2D-Matrix

UNIT IV User-defined data types, Pre-processor Directives and standard storage

Need for user-defined data type – structure definition – Structure declaration – Array within aStructure – Array of Structures – Nested Structures - Unions – Declaration of Union data type, Struct Vs Union - Enum – Pre-processor directives , Standard storage methods, Operations on file, File handling methods, Orientation to Object oriented programming

Practice: Structure padding, user-defined data storage and retrieval programs

UNIT V Operating system principles and Database concepts

Introduction to Operating system principles, Process scheduling algorithms, Deadlock detection and avoidance, Memory management, networking: Introduction to Networking, OSI Model Vs. TCP/IP suite, Data link layer, Internet layer, DVR Vs. LSR, Transport Layer, Application Layer

Course Outcomes for Third Year First Semester Course	
Course Code: B17BS3102	
Course Title: BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite

IPR & PATENTS (B17BS3105)
(Common to CE, EEE & ME)

UNIT I

Intellectual Property Law: Basics - Types of Intellectual Property - Innovations and Inventions - Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Compliance and Liability Issues

UNIT II

Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership–Copyright Formalities and Registration – Limitations – Infringement of Copyright - Plagiarism and difference between Copyright infringement and Plagiarism

UNIT III

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures Trade Mark maintenance– Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT IV

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent Patent Infringement and Litigation – International Patent Law – Double Patenting

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Course Outcomes for Third Year First Semester Course	
Course Code: B17BS3105	
Course Title: IPR & PATENTS	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Regulation: R17					III / IV - B.Tech. II- Semester				
ELECTRICAL & ELECTRONICS ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 EE3201	Advanced Control Systems	ES	3	3	1	--	30	70	100
B17 EE3202	Power Electronics	ES	3	3	1	--	30	70	100
B17 EE3203	Power System Analysis And Stability	ES	3	3	1	--	30	70	100
B17 EE3204	Digital Signal Processing	ES	3	3	1	--	30	70	100
B17 EE3205	Power System Protection	ES	3	3	1	--	30	70	100
# OE	Open Elective	ES	3	3	1	--	30	70	100
B17 EE3207	Electrical Machines – II Lab	ES	2	--	--	3	50	50	100
B17 EE3208	Control Systems Lab	ES	2	--	--	3	50	50	100
B17 BS3201	Employability Skills	BS	1	--	3	--	30	70	100
B17 BS3203	Advanced Coding	BS	1	--	--	3	50	50	100
Total			**24**	**18**	**9**	**9**	**360**	**640**	**1000**

OPEN ELECTIVE	B17 CS 3214	Oops Through Java
	B17 CS 3217	Unix & Shell Programming
	B17 CS 3218	Neural Networks & Fuzzy Logic
	B17 EC 3203	VLSI Design
	B17 ME 3210	Industrial Robotics

SYLLABUS: ADVANCED CONTROL SYSTEMS (B17EE3201)

UNIT I CONTROL SYSTEMS COMPONENTS: D.C. & A.C. Tachometers- Synchros, A.C. and D.C. Servo Motors-Stepper Motors and Its Use in Control Systems, Amplifying,Metadyne, Magnetic Amplifier –Principle, Operation.

UNIT II STATE VARIABLE ANALYSIS: Concept of State, State Variables & State Models, State Model for Linear Continuous Time Systems, Solution of State Equation, State Transition Matrix, Concept Of Controllability & Observability (Simple Problems To Understand Theory).

UNIT III THE Z-TRANSFORM: Introduction To Z-Transforms and Inverse Z-Transforms.(Simple Problems to Understand Theory).

UNIT IV INTRODUCTION TO DESIGN: Introduction-Preliminary Considerations ofClassical Design-Lead Compensation-Lag Compensation-Realization of Compensating Networks-Cascade Compensation in Frequency Domain (Bode Plot Techniques) - Pole Placement By State Feed-Back.

UNIT V STABILITY: Stability of Linear Digital Control Systems, Definition & Theorem, Stability Tests, Bi-Linear Transformation Method, Jury‟s Stability Test.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3201	
Course Title: ADVANCED CONTROL SYSTEMS	
CO-1	Know the various components and usage of each component.
CO-2	Derive stat space model for a given systems and Apply the concept of Observability and Controllability for LTI system.
CO-3	Apply Z- transform in Engineering application related to digital control systems.
CO-4	Design classical controller based on bode plots and modern controllers based on the state space techniques
CO-5	Test the digital system which is useful after designing a particular system with respect to the stability point of view.

SYLLABUS: POWER ELECTRONICS (B17EE3202)

UNIT I MODERN POWER SEMI CONDUCTOR DEVICES

Thyristors – Silicon Controlled Rectifiers (SCRs) – BJT – Power MOSFET – Power IGBT and their characteristics. Basic theory of operation of SCR – Static characteristics and Dynamic characteristics of SCR - Turn on and Turn off times – Turn on and turn off methods. Two transistor analogy of SCR -Series and parallel Connections of SCRs Snubber circuit details – Numerical problems.

UNIT II THYRISTORFIRING AND COMMUTATIONCIRCUITS

SCR trigger circuits-R, RC and UJT triggering circuits. The various commutation methods of SCRs-Load commutation- Resonant Pulse Commutation- Complementary Commutation- Impulse Commutation- External Pulse Commutation Techniques. Protection of SCRs

UNIT III PHASE CONTROLLED RECTIFIERS

Principles of phase controlled rectification -Study of Single phase and three-phase halfcontrolled and full controlled bridge rectifiers with R, RL, RLE loads. Effect of source inductance. Dual converters- circulating current mode and circulating current free mode- control strategies. Numerical problems.

UNIT IV CHOPPERS, CYCLONVERTER AND AC VOLTAGE CONTROLLER

Classification of Choppers A, B, C, D and E, Switching mode regulators-Study of Buck, Boost and Buck-Boost regulators, Cu regulators. Principle of operation of Single phase bridge type Cyclo converter and their applications. Single phase AC Voltage Controllers with R and RL loads.

UNIT V INVERTERS

Principle of operation of Single phase Inverters -Three phase bridge Inverters (180^0 and 120^0 modes)-voltage control of inverters-Single pulse width modulation- multiple pulse width modulation, sinusoidal pulse width modulation. Harmonic reduction techniues- Comparison of Voltage Source Inverters and Current source Inverters

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3202	
Course Title: POWER ELECTRONICS	
CO-1	Explain the principle of operation of thyristor, modern power semiconductor devices and necessity of series and parallel connection of thyristors.
CO-2	Explain the operation of Firing and Commutation techniques.
CO-3	Evaluate the phase controlled rectifiers with different loads.
CO-4	Analyze different Choppers, Cyclo-converter and AC voltage Controller configurations.
CO-5	Investigate harmonic reduction techniques for inverters based on PWM techniques

SYLLABUS: POWER SYSTEM ANALYSIS AND STABILITY (B17EE3203)

UNIT I P.U. REPRESENTATION: Single Line Diagram, Per Unit Quantities, P.U.Impedance of 3-Winding Transformers, P.U. Impedance Diagram of a Power System.

UNIT II LOAD FLOW STUDIES: Formulation of Network Matrices, Load Flow Problem, Gauss-Seidel Method, Newton-Raphson Method & Fast Decoupled Method of Solving Load Flow Problem.

UNIT III SYMMETRICAL FAULT ANALYSIS: 3-Phase Short Circuit Currents andReactance"s of a Synchronous Machine, Fault Limiting Reactors.

UNIT IV SYMMETRICAL COMPONENTS: The Symmetrical Components, Sequence Impedances and Sequence Networks. Phase Shift in Delta/Star Transformers, 3-Phase Power in terms of Symmetrical Components.

UN-SYMMETRICAL FAULTS: LG, LL and LLG Faults on an Unloaded Alternator.

UNIT V POWER SYSTEM STABILITY: Concepts of Stability (Steady State And Transient), Swing Equation, Equal Area Criterion, Critical Clearing Angle and Time for Transient Stability, Step by Step Method of Solution, Factors Affecting Transient Stability.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3203	
Course Title: POWER SYSTEM ANALYSIS AND STABILITY	
CO-1	Understand single line diagram, reactance diagram of the power system.
CO-2	Apply different load flow techniques to solve power system problems.
CO-3	Analyse different types of faults in a power system
CO-4	Analyse steady state and transient stability problems of power system.

SYLLABUS: DIGITAL SIGNAL PROCESSING B17EE3204)

UNIT-I DISCRETE - TIME SIGNALS AND SYSTEMS:

Discrete Time Signals & Sequences, Z-Transform and ROC, Linear Shift – Invariant Systems, Stability And Causality, Linear Constant Coefficient Difference Equations, System Function H (Z) Of Digital Systems, Structure And Realization Of Digital Filters.

UNIT-II DISCRETE TIME FOURIER TRANSFORM (DTFT) & DISCRETEFOURIER TRANSFORM (DFT):

DTFT--Frequency Domain Representation of Discrete Time Signals and Systems. DFT-- Properties of The

DFS, DFS Representation Of Periodic Sequences, Properties Of DFT. Convolution Of Sequences, Long Duration Sequence Filtering.

UNIT-III FAST – FOURIER TRANSFORMS (FFT):

Radix – 2 Decimation – In – Time (DIT) And Decimation – In – Frequency (DIF) FFT Algorithms, Inverse FFT.

UNIT-IV IIR DIGITAL FILTER DESIGN TECHNIQUES:

General Considerations in Digital Filter Design. IIR Filter Design-Bilinear Transformation Method, Impulse Invariance Technique. Design Of IIR Filters From Analog Filters (Butterworth Approximation Only). Frequency Transformations.

UNIT-V FIR DIGITAL FILTER DESIGN:

Linear Phase FIR filters, Fourier Series Method, Design Of FIR Filter Using Windows (Rectangular, Bartlett, Hanning& Hamming Windows). Comparison Of IIR And FIRFilters.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17 EE 3204	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Analyse difference equations of linear time-invariant systems and Evaluate the transfer functions using Z transforms.
CO-2	Represent signals mathematically in continuous and discrete-time, and in the frequency domain.
CO-3	Solve the linear and circular convolutions of discrete-time sequences.
CO-4	Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms, relate it to the DTFT.
CO-5	Design IIR& FIR filters

SYLLABUS: POWER SYSTEM PROTECTION (B17EE3205)

UNIT-I: Introduction to Power System Protection: Need for protective systems, Nature and causes of faults, Types and effects of faults, Fault statistics, Evolution of protective relays, Zones of protection, Primary and Back-up protection, Essential qualities of protection, Classification of protective relays, Classification of Protective Scheme, CTs and PTs and their applications in protection schemes, Summation transformer, Phase-sequence current segregating network, Basic relay terminology.

UNIT-II: Fuses and Circuit Breakers: Fuses and their types, High-voltage HRC fuses and their applications, Selection of fuses. Circuit breakers, Formation of arc, Methods of arc extinction, Restriking voltage, Recovery voltage, RRRV, Single and double frequency transients, Resistance switching, Current chopping, Switching of capacitor banks and un- loaded lines, Ratings and characteristics of circuit breakers.

UNIT-III: Types of Circuit Breakers and Testing: Principle of operation of circuit breakers, Classification of circuit breakers, Constructional Features of Air Circuit Breakers, Oil Circuit Breakers, Air Blast Circuit Breakers, SF-6 Circuit Breakers and Vacuum Circuit Breakers, Testing of Circuit Breakers.

UNIT-IV: Protective Relays: Different types of protective relays, Principle of operation andcharacteristics of relays, Overcurrent, Earth fault and Phase fault protection, Differential and Distance protection with simple applications to Alternators; Transformers; Single and parallelfeeders. Introduction to Static relaying, Static relays for time lag Overcurrent and DifferentialProtection.

UNIT-V: Overvoltage Protection: Causes of over voltages, Over voltages due to Lightning, Protection against Lightning and Travelling Waves – Earth Wire, Spark Gap, Surge Arresters, Lightning Arresters, Surge Absorber, Peterson Coil, Insulation Co-ordination.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3205	
Course Title: POWER SYSTEM PROTECTION	
CO-1	Identify the need for protection and know various devices for protection and terminology used in protection.
CO-2	Discriminate the constructional details with operation principle of various types of fuses, circuit breakers, relays, lightning arresters and their applications.
CO-3	Apply the arc quenching methods to various types of circuit breakers.
CO-4	Apply various relays to various types of power system equipment like alternator, transformer and feeders and distinguish between an electromagnetic relay and a static relay.
CO-5	Identify the different causes for over voltages and choose various protection devices against over voltages.

SYLLABUS: OOPS THROUGH JAVA (B17CS3214)
(Common to ECE & EEE)
(Open Elective)

UNIT-I:

Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of java, java features, JVM, program structure.

Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.

UNIT-II:

Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

UNIT-III:

Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java. lang package. Exception handling, importance of try, catch, throw, throws and finally block, user- defined exceptions, Assertions.

UNIT-IV:

Multithreading: introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data tofiles, random access file,

UNIT-V:

Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes.

AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3214	
Course Title: OOPS THROUGH JAVA	
CO-1	Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.
CO-2	Write, compile, execute and troubleshoot Java programming for networking concepts.
CO-3	Build Java Application for distributed environment.
CO-4	Design and Develop multi-tier applications.
CO-5	Identify and Analyze Enterprise applications

SYLLABUS: UNIX & SHELL PROGRAMMING (B17CS3217)
(Open Elective)

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commandsin Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What"s in a File-Directories and File Names- Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $?Variable knowing the exit Status-More about the Set Command-The Exit Command- Branching Control Structures-Loop Control Structures-The Continue and Break Statement- The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell

Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3217	
Course Title: UNIX & SHELL PROGRAMMING	
CO1	Documentation will demonstrate good organization and readability.
CO2	File processing projects will require data organization, problem solving and research.
CO3	Scripts and programs will demonstrate simple effective user interfaces
CO4	Scripts and programs will demonstrate effective use of structured programming
CO5	Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
CO6	Testing will demonstrate both black and glass box testing strategies
CO7	Project work will involve group participation

SYLLABUS: NEURAL NETWORKS & FUZZY LOGIC (B17CS3218)

(Open Elective)

UNIT – I: INTRODUCTION TO NEURAL NETWORKS

Introduction, Humans and Computers, Biological Neural Networks, Historical development of neural network, Terminology and Topology, Biological and artificial neuron models, Basic learning laws.

UNIT- II: FEED FORWARD NEURAL NETWORKS

Introduction, Perceptron models: Discrete, continuous and multi-category, Training algorithms: Discrete and Continuous Perceptron Networks, Perceptron convergence theorem, Limitations and applications of the Perceptron model, Generalized delta learning rule, Feed forward recall and error back propagation training, Hopfield networks.

UNIT -III: ASSOCIATIVE MEMORIES

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem.

UNIT IV: CLASSICAL AND FUZZY SETS

Introduction to classical sets - properties, operations and relations; Fuzzy sets, membership, Uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions. Fuzzy Logic System Components-Fuzzification, Membership value assignment, development of rule base and decision making system, defuzzification to crisp sets, defuzzification methods.

UNIT V ANN AND FUZZY LOGIC APPLICATIONS:

ANN: Load forecasting-System identifications-pattern recognition. Fuzzy logic: Fuzzy logiccontroller in ALFC system and Fuzzy classification in power system fault transients.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17CS3218	
Course Title: NEURAL NETWORKS & FUZZY LOGIC	
CO1	Understand neural networks and analyze different types of neural networks
CO2	Design training algorithms for neural networks.
CO3	Analyze and design fuzzy logic systems.
CO4	Apply AI Techniques in electrical engineering.

SYLLABUS: VLSI DESIGN (B17 EC 3203)
(Common to ECE & EEE (Open Elective))

UNIT-I: Introduction:

Introduction to IC Technology, Fabrication process: NMOS, PMOS and CMOS. I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans conductance, Output Conductance and Figure of Merit. NMOS Inverter ,Pull-up to Pull- down Ratio for NMOS inverter driven by another NMOS Inverter, and through one or more pass transistors, Alternative forms of pull-up, The CMOS Invertor, Latch-up in CMOS circuits, Comparison between CMOS and Bi-CMOS technology.

UNIT-II: MOS and Bi-CMOS Circuit Design Processes:

MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µm Double Metal, DoublePoly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Translation to Mask Form.

UNIT-III: Basic Circuit Concepts:

Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Choice of layers

Scaling of MOS Circuits: Scaling models, Scaling factors for device parameters, Limits due to sub threshold currents, current density limits on logic levels and supply voltage due tonoise and current density. Switch logic, Gate logic.

UNIT-IV: Test and Testability:

Design for Testability, Practical design for Test (OFT) Guidelines, Scan Design Techniquesand Built-In-Self Test.

FPGA Based Systems: Introduction, Basic concepts, FPGA architecture.

UNIT-V: Introduction to Low Power VLSI Design:

Introduction to Deep submicron digital IC design, Low power CMOS Logic circuits: Over view of power consumption, Low –Power design through voltage scaling, Estimation and optimization of switching activity, Reduction of switching capacitance, interconnect Design, Power Grid and Clock Design.

Course Outcomes for Third Year Second Semester Course	
Course Code: **B17 EC 3203**	
Course Title: **VLSI DESIGN**	
CO1	Apply the Concept of design rules during the layout of a circuit.
CO2	Model and simulate digital VLSI systems using hardware design language.
CO3	Synthesize digital VLSI systems from register-transfer or higher level description
CO4	Understand current trends in semiconductor technology, and how it impacts scaling and performance
CO5	Understand the basic concepts of FPGA and low power VLSI design

SYLLABUS: INDUSTRIAL ROBOTICS (B17ME3210)
(Common to ECE & EEE)(Open Elective)

UNIT-I

Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

UNIT – II

Components Of The Industrial Robotics: Function line diagram representation of robot arms,common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison ofElectric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – III

Motion Analysis: Homogeneous transformations as applicable to rotation and translation –problems.
Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.
Differential transformation and manipulators, Jacobians– problems Dynamics: Lagrange – Eulerand Newton – Euler formulations – Problems.

UNIT IV

General considerations in path description and generation. Trajectory planning and avoidanceof obstacles, path planning, Skew motion, joint integrated motion –straight line motion – Robot programming, languages and software packages-description of paths with a robot programming language..

UNIT V

Robot Actuators and Feed Back Components:
Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.
Feedback components: position sensors – potentiometers, resolvers, encoders – Velocitysensors.
Robot Applications in Manufacturing:
Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arcwelding & spray painting - Assembly and Inspection.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17ME3210	
Course Title: INDUSTRIAL ROBOTICS	
CO-1	Identify various robot configuration and components,
CO-2	Select appropriate actuators and sensors for a robot based on specific application
CO-3	Carry out kinematic and dynamic analysis for simple serial kinematic chains.
CO-4	Perform trajectory planning for a manipulator by avoiding obstacles
CO-5	Identify various robot configuration and components,

SYLLABUS: ELECTRICAL MACHINES-II LAB

List of Experiments

1. No Load and Blocked Rotor test on a three-phase squirrel cage induction motor.
2. Regulation of alternator by EMF and MMF methods.
3. Regulation of alternator by ZPF method.
4. Characteristics of line excited induction generator.
5. Characteristics of induction start synchronous motor.
6. Load test on three phase slip ring induction motor.
7. V and inverted V curves of synchronous motor.
8. Measurement of X_d and X_q of a synchronous machine.
9. Equivalent circuit of a single-phase induction motor.
10. Measurement of sequence reactances of a synchronous machine.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3207	
Course Title: ELECTRICAL MACHINES-II LAB	
CO-1	Calculate the regulation of an alternator by EMF,MMF and ZPF methods.
CO-2	Verify Alternator synchronism and draw the performance characteristics, finding out different reactances.
CO-3	Find the efficiency and machine performances by conducting various tests on 3-Φ and 1- Φ induction motor.
CO-4	Verify the speed variation of induction machine.
CO-5	Calculate the regulation of an alternator by EMF,MMF and ZPF methods.

SYLLABUS: CONTROL SYSTEMS LAB (B17EE3208)

List of experiments:

1. Magnetic amplifier
2. Study of DC Servo motor
3. DC Position control system
4. Study of first order system
5. Study of second order system
6. Speed torque characteristics of AC Servomotor
7. PID Controller
8. Synchro Transmitter and Receiver pair
9. Study of digital control system
10. Study of Lead-Lag compensators

Course Outcomes for Third Year Second Semester Course	
Course Code: B17EE3208	
Course Title: CONTROL SYSTEMS LAB	
CO-1	Formulate transfer function for given control system problems.
CO-2	Find time response of given control system model.
CO-3	Apply Root Locus and Bode plots for given control system model

SYLLABUS: EMPLOYABILITY SKILLS (B17BS3201)

(Common to all Branches)

Part-A: Verbal Aptitude and Soft Skills-II

UNIT -I (VA)

Sentence Improvement (finding a substitute given under the sentence as alternatives), Sentence equivalence (completing a sentence by choosing two words either of which will fit in the blank), cloze test (reading the written discourse carefully and choosing the correct options from the alternatives and filling in the blanks), summarizing and paraphrasing.

UNIT- II (VA)

Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the author's intention of writing a passage), strategies

for quick reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

UNIT- III (VA)

Punctuation, discourse markers, general Essay writing, writing Issues and Arguments (with emphasis on creativity and analysis of a topic), paragraph writing, preparing reports, framinga Statement of purpose Letters of Recommendation business letter writing, email writing, writing letters of complaints/responses. Picture perception and description, book review.

UNIT-IV (VA)

Just a minute sessions, reading news clippings in the class, extempore speech, telephone etiquette, making requests/suggestions/complaints, elocutions, debates, describing incidents and developing positive nonverbal communication, story narration, product description.

UNIT-V (SS)

Employability Skills – Significance — Transition from education to workplace - Preparing a road map for employment – Getting ready for the selection process, Awareness about Industry / Companies – Importance of researching your prospective workplace - Knowing about Selection process - Resume Preparation: Common resume blunders – tips, Resume Review, Group Discussion: Essential guidelines – Personal Interview: Reasons for Rejection and Selection

Part-B: Quantitative Aptitude-II

UNIT I: Averages, mixtures and allegations, Data interpretation Understanding of AM, GM,HM-Problems on averages, Problems on mixtures standard method. Importance of data interpretation: Problems of data interpretation using line graphs, Problems of data interpretation using bar graphs, Problems of data interpretation using pie charts, Problems of data interpretation using others.

UNIT II: Puzzle test, blood Relations, permutations, Combinations and probability Importance of puzzle test, Various Blood relations-Notation to relations and sex making of family Tree diagram, Problems related to blood relations, Concept of permutation and combination, Problems on permutation, Problems on combinations, Problems involving both permutations and combinations, Concept of probability-Problems on coins, Problems on dice,Problems on cards, Problems on years.

UNIT III: Periods, Clocks, Calendars, Cubes and cuboids deriving the formula to find the angle between

hands for the given time, finding the time if the angle is known, Faulty clocks, History of calendar-Define year, leap year, Finding the day for the given date, Formula and method to find the day for the given date in easy way, Cuts to cubes, Colors to cubes, Cuts to cuboids, Colors to cuboids.

UNIT IV: Puzzles Selective puzzles from previous year placement papers, sitting arrangement, problems-circular arrangement, linear arrangement, different puzzles.

UNIT V: Geometry and Mensuration Introduction and use of geometry-Lines, Line segments, Types of angles, Intersecting lines, Parallel lines, Complementary angles, supplementary angles, Types of triangles-Problems on triangles, Types of quadrilaterals- Problems on quadrilaterals, Congruent triangles and properties, Similar triangles and itsapplications, Understanding about circles-Theorems on circles, Problems on circles, Tangentsand circles, Importance of mensuration-Introduction of cylinder, cone, sphere, hemi sphere.

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3201	
Course Title: EMPLOYABILITY SKILLS	
	Part-A (Verbal Aptitude and Soft Skills-II)
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.
	Part-B (Quantitative Aptitude-II)
CO-1	The students will be able to perform well in calculating different types of data interpretation problems.
CO-2	The students will perform efficaciously on analytical and logical problems using various methods.
CO-3	Students will find the angle measurements of clock problems with the knowledge of calendars and clock.
CO-4	The students will skillfully solve the puzzle problems like arrangement of different positions.
CO-5	The students will become good at solving the problems of lines, triangulars, volume of cone, cylinder and so on.

SYLLABUS: ADVANCED CODING (B17BS3203)
(Common to ECE & EEE)

UNIT I Review Coding essentials and modular programming

Introduction to Linear Data, Structure of linear data, Operation logics, Matrix forms andrepresentations, Pattern coding.

Introduction to modular programming: Formation of methods, Methods: Signature anddefinition, Inter-method communication, Data casting & storage classes, Recursions

UNIT II Linear Linked Data

Introduction to structure pointer, Creating Links Basic problems on Linked lists, Classical problems on linked lists. Circular Linked lists, Operations on CLL, Multiple links, Operationson Doubly linked lists

UNIT III Abstract Data-structures

Stack data-structure, Operations on stack, Infix/Prefix/Post fix expression evaluations, Implementation of stack using array, Implementation of stack using linked lists.

Queue data-structure: Operations on Queues, Formation of a circular queue, Implementation of queue using stack, Implementation of stack using array, Implementation of stack using linked lists

UNIT IV Running time analysis of code and organization of linear list data

Code evaluation w.r.t running time, Loop Complexities, Recursion complexities, Searching techniques: sequential Vs. binary searching.

Organizing the list data, Significance of sorting algorithms, Basic Sorting Techniques: Bubble sort, selection sort, Classical sorting techniques: Insertion sort, Quick sort, Mergesort.

UNIT V Standard Library templates and Java collections

Introduction to C++ language features, working on STLs, Introduction to Java as ObjectOriented language, Essential Java Packages, Coding logics.

Note: This course should focus on Problems

Course Outcomes for Third Year Second Semester Course	
Course Code: B17BS3203	
Course Title: ADVANCED CODING	
CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

INFORMATION TECHNOLOGY

Regulation: R17									I / IV - B.Tech. I - Semester
INFORMATION TECHNOLOGY (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	Name of the Subject	C	Cr	L	T	Lab	IM	EM	Total Marks
B17 BS1101	English – I*	BS	3	3	1	--	30	70	100
B17 BS1102	Mathematics – I*	BS	3	3	1	--	30	70	100
B17 BS1103	Mathematics-II	BS	3	3	1	--	30	70	100
B17 BS1104	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS1101	Computer Programming Using C	ES	3	3	1	-	30	70	100
B17 CE1101	Environmental Studies *	ES	2	2	1	--	30	70	100
B17 BS1106	Engineering Physics Lab	BS	2	--	--	3	50	50	100
B17 BS1108	English Communication Skills Lab – I *	BS	2	--	--	3	50	50	100
# DL1	Department Lab	ES	2	--	--	3	50	50	100
B17 BS1110	Engineering Physics Virtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS1112	NCC	BS	--	--	--	2	--	--	--
Total			23	17	6	13	330	570	900

* Cr – Credits
C – Category
L – Lecture Hours
T – Tutorial Hours
IM – Internal Marks
EM – External Marks

#DL 1	CSE & IT	B17 CS 1102	C Programming Lab & Hardware Fundamentals
	ECE	B17 CS 1103	C Programming Lab

SYLLABUS: ENGLISH – I (B17 BS 1101)

(Common to all Branches)

Life through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I

People and Places:-Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types-Describing people, places and events-Writing sentences-Self-awareness- Self-motivation, Dialogue writing.

UNIT-II

Personality and Lifestyle: - Word quiz – Verbs-Adverbs-Negotiations-Proving yourself- Meeting Carl Jung-Describing yourself- Living in the 21st century- Using your dictionary- Communication-Adaptability.

UNIT-III

Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User's Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue-Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

UNIT-IV

Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewingemployees- Your first interview- Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V

Work and Business:- A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The InsideStory,* Mark Zuckerberg: World's Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business- Recession-Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17BS1101	
Course Title: ENGLISH-I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS – I (B17 BS 1102)

(Common to all Branches)

UNIT I: Differential equations of first order and first degree:

Linear, Bernoulli, Exact, Reducible to exact types. Applications: Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e ax, sin ax, cos ax, polynomials in x, eaxV(x), xV(x), Method of Variation of parameters. Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:

Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT IV: Partial differentiation:

Introduction, Homogeneous functions, Euler‟s theorem, Total derivative, Chain rule, which variable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign. Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange‟s method (with constraints)

UNIT V: First order and higher order partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit‟s method). Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type eax+by, sin (ax+by), cos (ax+by), xm y n.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS-I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newtons law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion
CO-3	Determine Laplace transform and inverse Laplace transform of various functions
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jocobian and maxima/minima of functions of two variables.

SYLLABUS: MATHEMATICS – II (B17 BS 1103)
(Common to CSE, ECE& IT)

UNIT I: Solution of Algebraic and Transcendental Equations:

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backwarddifferences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second order and fourth order).

UNIT IV: Fourier series:

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval's formula.

UNIT V: Fourier Transforms:

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval"s identities, Finite Fourier transforms.

Course Outcomes for First Year First Semester Course	
Course Code: B17BS1103	
Course Title: MATHEMATICS-II	
CO-1	Find a real root of algebraic and transcendental equations using different methods.
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpsons rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: ENGINEERING PHYSICS (B17 BS 1104)
(Common to CSE, ECE& IT)

UNIT I: Interference and Diffraction

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton's rings-Michelson's interferometer. Fraunhoffer‟s diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers

Introduction, Spontaneous emission and Stimulated emission – Einstein's relation – Requirements of Laser device-Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle- Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

UNIT- III: Electro Magnetic Fields and Ultrasonic

Concept of Electromagnetic induction , Faraday's law, Lenz's law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere's law,

Maxwell's equations and their significance (withoutderivation).

Definition of Ultrasonic-Methods of Producing Ultrasonic- Detection of Ultrasonic- Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function- significance-Schrodinger's time dependent and time independent wave equations- Eigen values and functions, Particle in a box. Band theory of Solids- Introduction- Kronig Penney model (Qualitative) - Energy bands ofcrystalline solids-Distinction between Conductors, Semiconductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC, FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg‟s law.

Introduction to Nanomaterials – Synthesis methods: Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

(Note: Assignment Marks of Engineering Physics are to be considered from the internal marks of Engineering Physics-- Virtual Labs – Assignments B17 BS 1110)

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1104	
Course Title: Engineering Physics	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fiber in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultra-sonic's as a tool for technological applications
CO-4	Learn the behaviour of particles at the very microscopic level by using wave nature of particles and understand the behaviour of materials and be able to classify them using the band theory of solids
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C (B17 CS 1101)

(Common to CSE, ECE & IT)

UNIT I:

Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computationalprocedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts.

Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high level languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling (gcc), Linking and Executing in under Linux.

BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arithmetic , relational and logical operators, increment and decrement operators,conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples,Multi-way selection: switch, else-if, examples.

ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, looping applications: Summation, powers, smallest and largest.

ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation

POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:

Objective: Understanding miscellaneous aspects of C

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration,definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, type def, bit-fields, program applications

BIT-WISE OPERATORS: logical, shift, rotation, masks.Objective: Comprehension of file operations

FILEHANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O,File I/O operations, example programs

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1101	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference
CO-6	Understand the dynamics of memory by the use of pointers
CO-7	Use different data structures and create/update basic data files.

SYLLABUS: ENVIRONMENTAL STUDIES
(B17 CE 1101)
(Common to all Branches)

UNIT – I

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. GlobalEnvironmental Crisis

Ecosystems:

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers andDecomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems DesertEcosystems and Aquatic Ecosystems

UNIT-II

Biodiversity:

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservationof Biodiversity: In-situ and Ex-

situ conservation of Biodiversity.

UNIT-III

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture. Forest Resources: Use and over exploitation-Mining and Dams-their effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. Energy Resources: Renewable and non-renewable energy sources, use of alternate energysources-impact of energy use on environment.

UNIT-IV

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India:

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

UNIT-V

Institutions and Governance:

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air.
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents.
CO-5	Constitutional provisions for the protection of natural resource

SYLLABUS: ENGINEERING PHYSICS LAB
(B17 BS 1106)
(Common to CSE, ECE& IT)

LIST OF EXPERIMENTS
(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton"s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde"s experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee"s apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young"s modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck"s constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1106	
Course Title: ENGINEERINGPHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the instruments/equipment individually
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

SYLLABUS: ENGLISH COMMUNICATIONSKILS LAB- I
(B17 BS 1108)

(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- Responding to Requests and asking for Directions - Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation-Practice work.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATIONSKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS (B17 CS 1102)

(Common to CSE & IT)

List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is

i) Prime Number
ii) Armstrong Number

b) Write a C program to print Floyd Triangle

c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch case

b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions - Continued

a) Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise-8

Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure

b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.

i) copy

ii) concatenate

iii) length

iv) compare

b) Implementation of string manipulation operations **without** library function.

i) copy

ii) concatenate

iii) length

iv) compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.
b) Write a C program to delete a file.

Exercise - 15

a) System Assembling, Disassembling and identification of Parts/Peripherals.

b) Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.

Exercise - 16

a) MS-Office / Open Office
   i. Word - Formatting, Page Borders, Reviewing, Equations, symbols
   ii. Spread Sheet-Organize data, usage of formula, graphs, charts.
   iii. Power point - features of power point, guidelines for preparing aneffective presentation.
b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewall settings. Installing application software, system software & tools.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)
   The Lab record must be a print of the LATEX (.tex) Format

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1102	
Course Title: C PROGRAMMING LAB& HARDWARE FUNDAMENTALS (Common to CSE & IT)	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals.
CO-7	Identification of various computer components, Installation of software

SYLLABUS: C PROGRAMMING LAB (B17CS1103)
(For ECE)
Programming

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbersFrom Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is
   i. Prime Number
   ii. Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returningvalues.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or DivideUsing switch…case
b) Write a C Program to convert decimal to binary and hex (using switch call function thefunction)

Exercise – 7 Functions - Continued

a) Write a C Program to compute the values ofsin x and cos x and e^x values using Seriesexpansion. (use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure

b) Write a C Program to Store Information Using Structures with Dynamically MemoryAllocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program,allocate memory dynamically using calloc () function.

c) Understand the difference between the above two programs.

Exercise – 12 Strings

a) Implementation of string manipulation operations **with** library function.

i) copy
ii) concatenate
iii) length
iv) compare

b) Implementation of string manipulation operations **without** library function.

i) copy
ii) concatenate
iii) length
iv) compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Note:
All the Programs must be executed in the Linux Environment. (Mandatory) The Lab record must be a print of the LATEX (.tex) Format

SYLLABUS: ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS (B17 BS 1110)

(Common to CSE, ECE & IT)

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson's interferometer
13. Black body radiation

URL: www.vlab.co.in

(Note: Internal Marks of Engineering Physics - Virtual Labs – Assignments are to be considered as Assignment marks in the Internal Marks of Engineering Physics- B17 BS 1104)

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1110	
Course Title: ENGINEERING PHYSICS VIRTUAL LABS–ASSIGNMENTS (Common to CSE, ECE & IT)	
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

Regulation: R17										I / IV - B.Tech. II - Semester
INFORMATION TECHNOLOGY (under Choice Based Credit System / Elective Course System)										
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)										
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**L**	**IM**	**EM**	**Total Marks**	
B17 BS1201	English – II*	BS	3	3	1	--	30	70	100	
B17 BS1203	Mathematics – III*	BS	3	3	1	--	30	70	100	
B17 BS1205	EngineeringChemistry	BS	3	3	1	--	30	70	100	
B17 ME1201	EngineeringDrawing	ES	3	1	--	3	30	70	100	
# DS 2	Department Subject	ES	3	3	1	--	30	70	100	
# DS 3	Department Subject	ES	3	3	1	--	30	70	100	
B17 BS1207	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100	
B17 BS1208	English Communication Skills Lab – II*	BS	2	--	--	3	50	50	100	
# DL2	Department Lab	ES	2	--	--	3	50	50	100	
B17 BS1212	Inner Engineering	BS	--	--	--	2	--	--	--	
Total			**24**	**16**	**5**	**14**	**330**	**570**	**900**	

# DS 2	CSE & IT	B17 CS 1202	Object Oriented Programming Through C++
	ECE	B17 CS 1203	Data Structures
#DS 3	CSE & IT	B17 EC 1201	Elements of Electronics Engineering
	ECE	B17 EE 1203	Elements of Electrical Engineering
#DL2	CSE & IT	B17 CS 1205	Object Oriented Programming Lab
	ECE	B17 BS 1209	Engineering Workshop & IT Workshop

*Cr – Credits

C – Category

L – Lecture Hours

T – Tutorial Hours

IM – Internal Marks

EM – External Marks

SYLLABUS: ENGLISH – II (B17 BS 1201)

(Common to all Branches)

UNIT I:

A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'

B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

UNIT II:

A. Detailed-Text: Unit 2: ' A Dilemma'

B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

UNIT III:

A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments

B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

UNIT IV:

A. Detailed-Text: Unit 4: 'The Lottery'

B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

UNIT V:

A. Detailed-Text: Unit 5: ' The Chief Software Architect'

B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS: MATHEMATICS – III (B17 BS 1203)

(Common to all Branches)

UNIT I: Linear systems of equations:

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.

Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.

Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.

Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

UNIT IV: Vector Differentiation:

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vectorintegral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related Problems

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix, Reduce a Quadratic form to its canonical form and classify
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green's, Stokes and Gauss divergence theorems.

SYLLABUS: ENGINEERING CHEMISTRY (B17 BS 1205)

(Common to CSE, ECE & IT)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications ofPolyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiberreinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.

Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination ofCalorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufactureof coke by Otto – Hoffmann"s by-product coke oven process; Refining of Petroleum, Knocking-octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG, CNG. Lubricants: - Definition, Mechanism of Lubrication, Properties of Lubricants (Definition andsignificance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells-Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings

– Galvanizing, Tinning, Electroplating; Electrroless plating; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electro dialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials

Cement: - Manufacture of Portland cement, setting and hardening of cement, Deterioration of cementconcrete. Refractories: - Definition, Characteristics, classification, Properties and failure of refactories. Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi-Conductors, Classification and chemistry of semiconductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1205	
Course Title: ENGINEERING CHEMISTRY (Common to CSE, ECE & IT)	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly, students understand liquid crystals and semiconductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: ENGINEERING DRAWING (B17 ME 1201)

(Common to CSE, ECE & IT)

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

UNIT III

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views toisometric views

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1201	
Course Title: ENGINEERING DRAWING(Common to CSE, ECE & IT)	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

OBJECT-ORIENTED PROGRAMMING THROUGH C++ (B17 CS 1202)

(Common to CSE & IT)

UNIT-I: Introduction to C++, Classes and Objects.
Difference between C and C++, Disadvantage of Conventional Programming, Basic Conceptsof Object Oriented Programming, Advantage of OOP, Object Oriented Languages, Functions in C++, Operators in C++. Classes and Objects: Declaring Objects, Access Specifiers and their Scope, Static data members, static member functions, arrays of objects, local classes, Nested classes.

UNIT-II: Constructors, Destructors and Operator Overloading.
Constructors and Destructors: Introduction- Constructors and Destructor- types of constructors, Constructors with default Arguments, Dynamic initialization of objects, Dynamic constructors. Operator Overloading Introduction, Overloading Unary Operators and Binary Operators, Overloading Unary Operators and Binary Operators using friend function, Overloading Assignment Operator (=), Overloading insertion(<<) and extraction(>>) operators, Manipulation of Strings using Operators, Rules for Overloading Operators, Type Conversions.

UNIT-III: Inheritance, Pointers, Virtual Functions and Polymorphism.
I**nheritance**: Reusability, Types of Inheritance, Virtual Base Classes, Abstract Classes, Advantages of Inheritance, Disadvantages of Inheritance, and constructors in derived classes. Pointers Introduction: Pointers to Objects, "this" Pointer, Pointers to Derived Classes, including Polymorphisms and Virtual Functions, Rules for Virtual Functions, pure virtual functions.

UNIT-IV: Manipulating Strings, Managing console I/O operations and Exception Handling.
Strings: Creating String Objects, Manipulating String Objects, Relational operations, String Characteristics, Accessing Characters in Strings. C++ Stream Classes, Unformatted I/O operations, Formatted I/O operations, managing output with Manipulators, Exception Handling:Principles of Exception Handling, Exception Handling Mechanism, throwing and catching Mechanism.

UNIT-V: Generic Programming with Templates, Standard Template Library and Files. Generic Programming with Templates, Need for Templates, Definition of class Templates,Normal Function Templates, Over Loading of Template Function-Bubble Sort Using FunctionTemplates, Difference between Templates and Macros, Overview of Standard TemplateLibrary, STL Programming Model, Containers, Algorithms, Iterators, Vectors, Lists, Maps.FILES: Introduction, File Stream Classes, File Operations, File Pointers and Manipulators, SequentialAccess Files, Random File Access Operation, Detecting End-of File, Command-Line Arguments.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1202	
Course Title: OBJECT-ORIENTED PROGRAMMING THROUGH C++ (Common to CSE & IT)	
CO-1	Write, compile and debug programs in C++ language. Use different data types in a computer program.
CO-2	Design programs involving decision structures, loops and functions.
CO-3	Explain classes and abstract classes and objects, abstraction and encapsulation, inheritance, polymorphism, constructors, access control and overloading.
CO-4	Solve a given application problem by going through the basic steps of program specifications, analysis, design, implementation and testing within the context of the object-oriented paradigm.

SYLLABUS: DATA STRUCTURES (B17 CS 1203)
(For ECE)

UNIT-I

Arrays and Structures

Array as an Abstract Data Type, Polynomial Abstract Data Type, Introduction to Sparse Matrix, Sparse Matrix Abstract Data Type, Representation of Multidimensional Arrays, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures.

Recursion, Simple Searching and Sorting Techniques

Recursive functions, Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Introduction to Merge Sort, Iterative Merge Sort, Recursive Merge Sort, Heap sort.

UNIT-II

Stacks and Queues

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, , Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Multiple Stacks and Queues, Circular Queues using arrays.

UNIT-III

Linked Lists

Pointers, Dynamically Allocated Storage using pointers, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Additional List Operations, Operations for Singly Linked Lists, Operations for Doubly Linked Lists, RadixSort.

UNIT-IV

Trees

Representation of Trees, Binary Trees Abstract Data Type,Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Priority Queues, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree, Counting Binary Trees.

UNIT-V

Graphs

Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First

Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim‟s and Kruskal‟s Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination - Dijkstra‟s Algorithm, All Pairs Shortest Paths - Floyd‟s Algorithm, Transitive Closure using Warshall‟s Algorithm.

ELEMENTS OF ELECTRONICS ENGINEERING (B17 EC 1201)

(Common to CSE & IT)

UNIT I: Semiconductors and P-N junction diode:

Intrinsic and extrinsic semiconductors, charge densities in semiconductors, Drift and Diffusion currents, Hall Effect, Mass action law.Basic operation and V-I Characteristics of semiconductor diode, Diode current equation, Avalanche breakdown and Zener breakdown phenomenon.

UNIT II: Special Diodes and Diode Rectifiers:

Zener Diode, LED, Photo Diode and tunnel diode, Half wave and Full wave Rectifiers- with andwithout filters, Bridge Rectifier, Expressions - Ripple factor, Efficiency, Capacitor filters

.

UNIT III: Bipolar Junction Transistor:

Introduction, construction, basic operation of npn and pnp transistors, Transistor circuit configurations- CE,CB, CC- Input and output Characteristics in various configurations’- parameter model for transistor amplifier.*(Introductory Treatment only).*

UNIT IV: Transistor Biasing and Thermal Stabilization:

Transistor Biasing, Thermal runaway, stabilization, Different methods of Biasing-Fixed Bias, collector feedback bias, self-bias, Bias compensation.

UNIT V: Field Effect Transistors: Junction field Effect Transistors (JFET)- JFET characteristics, JFET Parameters, Small Signal model of FET, Depletion and Enhancement type MOSFET‟s.

Course Outcomes for First Year First Semester Course	
Course Code:B17 EC 1201	
Course Title: ELEMENTS OFELECTRONICS ENGINEERING (Common to CSE & IT)	
CO-1	Understand the basic concepts of transport of charge carriers in semiconductors, drift and diffusion currents, physical structure, operation, V-I characteristics of semiconductor diode. .
CO-2	Understand the basic concepts of special types of diodes like Zener Diode, LED, Photo Diode and tunnel diode, rectifier circuits with and without filters.
CO-3	Understand the physical structure, operation, input and output characteristics of BJT in CE, CB, CC circuit configurations.
CO-4	Understand the basic concepts of transistor biasing and thermal stabilization.
CO-5	Understand the physical structure, operation, characteristics and circuit models of JFET‟s and MOSFET‟s.

SYLLABUS: ELEMENTS OF ELECTRICAL ENGINEERING (B17 EE 1203)
(For ECE)

UNIT I: Electrical and Magnetic Circuits:

Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, Series and parallelCircuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday's laws, Lenz's law, statically induced EMF, dynamically induced EMF.

UNIT – II: DC Machines:

Principle of operation of DC Generator - EMF equation – Construction-Types of DC generator- OCC of DC Generator-DC motor types - Torque equation –Losses-Efficiency-speed control methods- applications

UNIT – III: Transformers:

Principle of operation of single phase transformer - EMF equation - equivalent circuit –losses - efficiency and regulation- Open circuit and Short circuit tests.

UNIT – IV: Induction Motors:

Construction-Principle of operation of induction motor-slip- rotor frequency, slip - torque characteristics - Power flow diagram-Efficiency-Applications

UNIT – V: Synchronous Generator and Measuring Instruments:

Construction-Principle of operation of alternator-EMF equation of alternator- Regulation bySynchronous impedance method.

Classification –Deflecting, controlling, damping Torque, ammeter, voltmeter, wattmeter, MI,MC instruments-Energy meter

SYLLABUS: ENGINEERING CHEMISTRY LAB (B17 BS 1207)

(Common to CSE,ECE & IT)

List of Experiments

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by $KMnO_4$.
4. Estimation of oxalic acid by $KMnO_4$
5. Estimation of Mohr"s salt by $K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler"s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1207	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipment's
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

SYLLABUS: ENGLISH COMMUNICATION SKILS LAB- II (B17 BS 1208)

(Common to All Branches)

- Debating & Practice.
- Group Discussions & Practice.
- Presentation Skills & Practice
- Interview Skills & Practice
- Email
- Curriculum Vitae & Practice
- Idiomatic Expressions
- Common Errors in English & Practice

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: OBJECT ORIENTED PROGRAMMING LAB (B17 CS 1205)

(Common to CSE & IT)

LIST OF PROGRAMS

1. Write a Programme that computes the simple interest and compound interest payable on principal amount (in Rs.) of loan borrowed by the customer from a bank for a giver period of time (in years) at specific rate of interest. Further determine whether the b bank will benefit by charging simple interest or compound interest

2. Write a Programme to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions

3. the fare to thepassenger according to following criteria.
4. Write a C++ Program to illustrate Enumeration and Function Overloading
5. Write a C++ Program to illustrate Scope and Storage class
6. Implementation of ADT such as Stack and Queues
7. Write a C++ Program to illustrate the use of Constructors and Destructors and ConstructorOverloading
8. Write a Program to illustrate Static member and methods
9. Write a Program to illustrate Bit fields
10. Write a Program to overload as binary operator, friend and member function
11. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
12. Write a C++ Program to illustrate Iterators and Containers
13. Write a C++ Program to illustrate function templates
14. Write a C++ Program to illustrate template class
15. Write C++ Programs and incorporating various forms of Inheritance
16. Write a C++ Program to illustrate Virtual functions
17. To write a C++ program to find the sum for the given variables using function with defaultarguments.
18. To write a C++ program to find the value of a number raised to its power that demonstrates afunction using call by value.
19. To write a C++ program and to implement the concept of Call by Address
20. To write a program in C++ to prepare a student Record using class and object
21. implement the concept of unary operator overloading by creating a C++ program.
22. Write a C++ program for swapping two values using function templates
23. Write a C++ program to implement a file handling concept using sequential access.

Course Outcomes for First Year First Semester Course	
Course Code: B17 CS 1205	
Course Title: OBJECT ORIENTED PROGRAMMING LAB	
CO-1	Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
CO-2	Apply an object-oriented approach to developing applications of varying complexities.

ENGINEERING WORKSHOP & IT WORKSHOP (B17 BS 1209)

(For ECE)

PART-A ENGINEERING WORKSHOP

SYLLABUS

Carpentry	Fitting
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

Note: At least two exercises to be done from each trade.

PART B: IT WORKSHOP:

LIST OF EXCERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along withnecessary Device Drivers.
3. MS-Office / Open Office

a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.

b) Spread Sheet - organize data, usage of formula, graphs, charts.

c) Power point - features of power point, guidelines for preparing an effective presentation.

d) Access- creation of database, validate data.

4. Network Configuration & Software Installation-Configuring TCP/IP, proxy andfirewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette,cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

SYLLABUS: INNER ENGINEERING (B17 BS 1212)
(Common to CSE, ECE & IT)

Unit-I

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in thepresent Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

Unit-II

YES!+ Workshop:

Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management –Happiness point – Opposite Values – Pranayama – Sudarshan kriya

Unit-III

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life –Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

Unit-IV

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

Unit -V

Service: Leadership in action – Contributing to society – Take up Responsibility –Empowerment – PublicSpeaking – Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1212	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

(Note: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

SYLLABUS: INNER ENGINEERING (B17 BS 1212)
(Common to CSE, ECE & IT)

Unit-I

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in thepresent Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

Unit-II

YES!+ Workshop:

Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management –Happiness point – Opposite Values – Pranayama – Sudarshan kriya

Unit-III

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life –Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

Unit-IV

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

Unit -V

Service: Leadership in action – Contributing to society – Take up Responsibility –Empowerment – PublicSpeaking – Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1212	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities.
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

(Note: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17	II / IV - B.Tech. I - Semester

INFORMATION TECHNOLOGY
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION & EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

CodeNo.	Course	C	Cr	L	T	Lab	IM	EM	Total Marks
B17 IT2101	Data Structures	ES	3	3	1	--	30	70	100
B17 IT2102	Java Programming	ES	3	3	1	--	30	70	100
B17 BS2105	Mathematical Foundations of Computer Science	BS	3	3	1	--	30	70	100
B17 IT2103	Computer Graphics	ES	3	3	1	--	30	70	100
B17 IT2104	Data Communications	ES	3	3	1	--	30	70	100
B17 IT2105	Digital LogicDesign	ES	3	3	1	--	30	70	100
B17 IT2106	Data Structures Lab	ES	2	--	--	3	50	50	100
B17 IT2107	Java ProgrammingLab	ES	2	--	--	3	50	50	100
B17 IT 2108	Basic Coding	ES	1	--	--	2	50	---	50
B17 BS2107	English Proficiency-I	BS	--	1	1	--	--	--	--
Total			**23**	**19**	**7**	**8**	**330**	**520**	**850**

* Cr – Credits
C – Category
L – Lecture Hours
T – Tutorial Hours
IM – Internal Marks
EM – Exam Marks

SYLLABUS: DATA STRUCTURES
(B17 IT 2101)

UNIT-I Basic Concepts:

Arrays, Dynamically Allocated Arrays, Structures and Unions, Polynomials, Sparse Matrix,Representation of Multi-dimensional Array, Pointers and Dynamic Memory Allocation, Algorithm Specification, Data Abstraction, Performance Analysis, performance Measurement.

Stacks and Queues:

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, Expressions, Evaluating Postfix Expressions, Infix to Postfix, Multiple Stacks and Queues,Circular Queues using arrays.

UNIT-II Linked Lists:

Single Linked Lists and Chains, Representing Chains in C, Linked Stack and Queue using Linked List, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Additional List Operations, Sparse Matrix Representation, Doubly Linked Lists.

UNIT-III Trees:

Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Priority Queues, Insertion into a max heap, Deletion from a max heap, Binary Search Trees: Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree.

UNIT-IV Graphs:

The Graph Abstract Data Type: Definitions, Graph Representations, Depth First Search, Breadth First Search, Spanning Trees, Minimum Cost Spanning Trees: Prim's and Kreskas's Algorithms,Single Source All Destination - Dijkstra‟s Algorithm, All Pairs Shortest Paths - Floyd's Algorithm, Transitive Closure using Warshall's Algorithm.

UNIT-V Searching and Sorting

Searching: Sequential Search, Binary Search, Interpolation Search.

Sorting: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort, RadixSort.

Course Outcomes for Second Year First Semester Course	
Course Code: B17IT2101	
Course Title: DATA STRUCTURES	
CO-1	Apply advanced data structure strategies for exploring complex data structures and implement data structures like stacks, queues
CO-2	Implement data structures on single, circular and double linked lists.
CO-3	Implement different operations on trees
CO-4	Apply graphs to real time applications.
CO-5	Perform sorting and searching using different algorithms.

SYLLABUS: JAVA PROGRAMMING

(B17 IT 2102)

UNIT- I

Fundamentals: HTML, OOP Concepts, Comparing JAVA with C & C++, JAVA Programminglanguage Syntax, Variables, Data types, statements and expressions.

UNIT -II

Control Statements: If else, for, while, and do while loops, Switch statements, break andcontinue.
Arrays & Structures: One Dimensional & Two Dimensional Arrays, Functions: ParameterPassing, this and super keywords.

UNIT -III

Features of JAVA: Classes and Interfaces, Threads and multithreaded programming, Exceptionhandling.

UNIT -IV

Introduction to packages, Math package, Lang package, Util package.
Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files.

UNIT -V

GUI Programming with Swing–Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, BorderLayout, Grid Layout, Card Layout, Grid Bag Layout.
Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.A Simple Swing Application, Applets – Applets and HTML, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2102	
Course Title: JAVA PROGRAMMING	
CO-1	Able to solve real world problems using OOP techniques.
CO-2	Able to understand the use of abstract classes.
CO-3	Able to solve problems using java I/o classes.
CO-4	Able to develop multithreaded applications.
CO-5	Able to develop multithreaded applications.
CO-6	Able to design GUI based applications.

SYLLABUS: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(B17 BS 2105)

UNIT -I: Mathematical Logic:

Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Normal Forms, Theory of Inferencefor Statement Calculus, Consistency of Premises. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory forPredicate Calculus.

UNIT -II:

Relations*:* Definition of Relation, Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams.

Algebraic Structures: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism.

UNIT -III Combinatorics:

Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Coefficients, Binomial and Multinomial Theorems, The Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application.

UNIT -IV: Recurrence Relations:

Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots,Solving Inhomogeneous Recurrence Relations

UNIT -V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs:Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite graphs, Planar Graphs, Euler's Formula.

Number Theory: Properties of Integers, Division theorem, Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem

SYLLABUS: COMPUTER GRAPHICS

(B17 IT 2103)

UNIT-I Introduction:

Computer Graphics and their applications: Computer Aided Design, Computer Art, Entertainment, Education and Training, Graphical User Interfaces; Overview of Graphics systems: Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors And Workstations, Input Devices, Hard Copy Devices, Interactive Input Methods, Windows and Icons, Virtual Reality Environments, Graphics Software.

UNIT-II Output primitives:

Points and Lines, , Line and Curve Attributes, Color and Gray scale levels, Ant aliasing, Loadingthe Frame buffer, Line function, Line Drawing Algorithms, Circle Generating Algorithms, Ellipse Generating Algorithms, Pixel Addressing, Area Fill Attributes, Filled Area Primitives, Filled Area Functions, Cell Array, Character Generation, Character Attributes, Bundled Attributes.

UNIT - III Two Dimensional Transformations:

Basic 2D Transformations, Matrix Representations, Homogeneous Coordinates, Composite Transformations, Other Transformations, Transformations between Coordinate Systems, Affine Transformations.

UNIT-IV Three Dimensional Transformations & Projections:

Translation, Rotation, Scaling, Other Transformations, Composite Transformations, 3D Transformation Functions, Modeling and Coordinate Transformations, Need for projections, Parallel & Perspective projections, General Projection Transformations.

UNIT-V Viewing Pipeline and Clipping operations:

Viewing Pipeline, Viewing Coordinates &Reference frames, Window-to-Viewport Coordinate Transformation, Two Dimensional Viewing Functions, Three Dimensional Viewing, View Volumes, Clipping and its Operations, Types of clipping operations- Point Clipping, Line Clipping, Polygon Clipping, Curve Clipping,, Text and Exterior Clipping.

Three Dimensional Concepts and Object representations: 3D display methods, 3D Graphics, Polygon Surfaces, Curved Lines and Surfaces, Quadratic Surfaces, Super Quadrics, Blobby Objects, Spline Representations, Bézier Curves and Surfaces, BSpline
Curves and Surfaces,

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2103	
Course Title: COMPUTER GRAPHICS	
CO-1	The students will understand graphics principles and graphics hardware.
CO-2	The students can demonstrate geometrical transformations
CO-3	The students can create interactive graphics applications and demonstrate computer graphics animation.

SYLLABUS: DATA COMMUNICATIONS (B17 IT 2104)

UNIT- I

Introduction to Data Communications: A Communications Model, Data Communications and Data Communications Networking, Protocols and Protocol Architecture, Characteristics of Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments

UNIT- II

Transmission Media: Guided Transmission Media, Wireless Transmission. Data Encoding: Digital Data-Digital Signals, Digital Data-Analog Signals, Analog Data-Digital Signals, Analog Data-Analog Signals.

UNIT- III

Data Communication Interface: Asynchronous and Synchronous Transmission, Line Configurations, Interfacing. Data Link Control Flow Control, Error Detection, Error Control

UNIT- IV

Multiplexing: Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing: Characteristics, TDM Link Control, Digital Carrier Systems, and Statistical Time-Division Multiplexing: Characteristics.

UNIT -V

Data Communications Hardware: Terminals: Introduction, Basic Terminal Components, Enhanced Terminal Components, General-Purpose Terminals, Remote Job Entry Terminals, Transaction Terminals, Clustering of Terminal Devices. Communication Processing Hardware: Introduction, Switching Processors, Multidrop Lins, Multiplexers, Concentrators, Front-End Processors

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2104	
Course Title: DATACOMMUNICATIONS	
CO-1	Understand basic concepts related communication systems.
CO-2	Understand different transmission Media.
CO-3	Understand concepts related to data communication hardware.
CO-4	Understand basic functionality of modems.
CO-5	Solve different counting problems
CO-6	Solve the recurrence relations which occur in many fields
CO-7	Utilize the concepts in graphs and Number theory in their fields.

SYLLABUS: DIGITAL LOGIC DESIGN (B17 IT 2105)

UNIT - I

Binary Systems and Boolean algebra: Digital Systems. Binary Numbers. Number Base Conversions. Octal and Hexadecimal Numbers. Complements. Signed Binary Numbers. Binary Codes. Binary Storage and Registers. Binary Logic, Basic Definitions of Boolean algebra. Axiomatic Definition of Boolean algebra. Basic Theorems and Properties of Boolean Algebra, Boolean Functions.

UNIT - II

Logic Gates and Gate-Level Minimization: Canonical and Standard Forms. Logic Operations..The Map Method. Four-Variable Map. Five-Variable Map. Product of Sums Simplification. Don"t-Care Conditions. Digital Logic Gates. NAND and NOR Implementation. Other Two- Level Implementations. Exclusive-OR Function

UNIT -III

Combinational Logic Design:

Combinational Circuits: Analysis Procedure. Design Procedure. Binary Adder-Subtractor. Decimal Adder. Binary Multiplier. Magnitude Comparator. Decoders. Encoders. Multiplexers.

UNIT - IV

Sequential Logic design: Sequential Circuits .Latches. Flip-Flops. Analysis of Clocked Sequential Circuits. State Reduction and Assignment. Designs Procedure. Registers. Shift Registers. Ripple Counters. Synchronous Counters. Other Counters.

UNIT-V

Memory and Programmable Logic: Introduction. Random-Access Memory. Memory Decoding, Error Detection and Correction. Read-Only Memory. Programmable Logic Array. Programmable Array Logic.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2105	
Course Title: DIGITAL LOGIC DESIGN	
CO-1	An ability to define different number systems, binary addition and subtraction, 2"s complement representation and operations with this representation. The different Boolean algebra theorems and apply them for logic functions.
CO-2	An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions
CO-3	An ability to define the following combinational circuits: multiplexer, de-multiplexers encoders/decoders, comparators, arithmetic-logic units and to be able to a build simple circuits
CO-4	An ability to understand asynchronous and synchronous sequential circuits, like counters and shift registers.
CO-5	An ability to understand memories like RAM and ROM, Programmable Logic Array and Programmable Array Logic.

SYLLABUS: DATA STRUCTURES LAB (B17 IT 2106)

LIST OF PROGRAMS

1. Write a program to implement the operations on stacks using Array.
2. Write a program for evaluating a given postfix expression
3. Write a program for converting a given infix expression to postfix form
4. Write a program to implement the operations on queues using Array.
5. Write a program to implement the operations on circular queues using Arrat.
6. Write a program to implement the Single Linked List operations (Insertion, Deletion).
7. Write a program to implement the operations on stacks using Linked List.
8. Write a program to implement the operations on Queue using Linked List.
9. Write a program to implement the Priority Queue operations using single Linked List.
10. Write a program to add two Polynomials using Linked List.
11. Write a program to add two sparse matrices using linked list
12. Write a program to implement the Circular Single Linked List operations (Insertion,Deletion).
13. Write a program to implement the Double Linked List operations (Insertion, Deletion).
14. Write a program to implement the De-queue operations using Double Linked List .
15. Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion
16. Write a program for finding the Depth First Search of a graph, and Breadth First Search of agraph
17. Write a program for sorting a list using Bubble sort and then apply binary search.
18. Write a program for quick sort
19. Write a program for Heap sort
20. Write a program for Merge sort.
21. Write a program for finding the transitive closure of a digraph

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2106	
Course Title: DATA STRUCTURES LAB	
CO-1	Apply advanced data structure strategies for exploring complex data structures.
CO-2	Implement data structures like stacks, queues
CO-3	Implement data structures on single, circular and double linked lists
CO-4	Implement different operations on trees.
CO-5	Apply graphs to real time applications.
CO-6	Perform sorting and searching using different algorithms.

SYLLABUS: JAVA PROGRAMMING LAB (B17IT2107)

LIST OF PROGRAMS

1. (a) Program to display the area of a rectangle.
   (b) Program to find Sum of series 1+x+x2+x3+……
2. (a) Write a class to display the area of rectangle and inherit this class into other class which is displaying perimeter of a rectangle and implement.
   (b) Write a class to add three no„s inherit this class into other class to add five no„s andimplement it.
3. (a) Write a program to print the path, filename and extension for a given path of a file.
   (b) Write a program to receive two command line arguments check whether they areequal or not.
4. (a) A program to take two arguments and divide the first argument with second argument and display the result. Displays the error message if divide by zero without abnormal exit.
   (b) A program to accept more than one string and arrange them in alphabetical order.
   (c) Write a program to display simultaneously output of even and odd numbers startingfrom one to specified number.
5. Write a program to accept data from keyboard and write it into a file.
6. Write a java program to implement stack & Queue operations.
7. Write a program to draw line and circle using mouse.
8. Write an applet program for drawing the bar chart.
9. Write an applet program to design a calculator for implementing basic functions like +,-,*, /.
10. Write a program to check active ports in system.

Course Outcomes for Second Year First Semester Course	
Course Code: B17IT2107	
Course Title: JAVA PROGRAMMING LAB	
CO-1	Students will be able to understand compiling and interpreting programs
CO-2	Students will be able to Explore features of Object Oriented Programming.
CO-3	Students will be able to implement various java concepts
CO-4	Students will be able to Develop java Programs to implement applets
CO-5	Students will be able to Develop java Programs to generate and handle events.

SYLLABUS: BASIC CODING (B17 IT 2108)

UNIT I Review of Programming constructs

Programming Environment, Expressions formation, Expression evaluation, Input and Output patterns, Control Structures, Sequential branching, Unconditional branching, Loop Structures, Coding for Pattern Display.

UNIT II Introduction to Linear Data, strings and pointers

Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding, Working on

character data, Compiler defined methods, Substitution coding for defined methods, Row Major representation, Column Major representation, Basic searching and sorting Methods.

UNIT III Functions, Recursions and Storage Classes

Functions – Introduction to modular programming – Function Communication - Pass by value, Pass by reference – Function pointers – Recursions – Type casting – Storage classes

Practice: programs on passing an array and catching by a pointer, function returning data,comparison between recursive and Iterative solutions.

Data referencing mechanisms: Pointing to diff. data types, Referencing to Linear data, Runtime-memory allocation, Named locations vs pointed locations, Referencing a 2D-Matrix

UNIT IV User-defined data types, Pre-processor Directives and standard storage

Need for user-defined data type – structure definition – Structure declaration – Array within a Structure – Array of Structures – Nested Structures - Unions – Declaration of Union data type, StructVs Union - Enum – Pre-processor directives , Standard storage methods, Operations onfile, File handling methods, Orientation to Object oriented programming

Practice: Structure padding, user-defined data storage and retrieval programs

UNIT V Operating system principles and Database concepts

Introduction to Operating system principles, Process scheduling algorithms, Deadlock detectionand avoidance, Memory management, networking: Introduction to Networking, OSI Model Vs. TCP/IP suite, Data link layer, Internet layer, DVR Vs. LSR, Transport Layer, Application Layer

Course Outcomes for Second Year First Semester Course	
Course Code: B17 IT 2108	
Course Title: BASIC CODING	
CO-1	Know about Control Structures, Loop Structures and branching in programming
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-6	Know different Operating System concepts.
CO-7	Differentiate OSI Model Vs. TCP/IP suite.

ENGLISH PROFICIENCY-I (B17BS2106)

(Common to All Branches)

UNIT-1: LISTENING

Selected Motivational Speeches

Selected Moral Stories

UNIT-2: SPEAKING

Book Review

Skit Presentation

PowerPoint Presentations

Describing event/place/thing

Extempore

Group Discussion

Picture Perception and Describing Test

UNIT-3: READING

Speeded Reading

Reading Comprehension

UNIT-4: WRITING

Paragraph Writing

Literary Appreciation – Understanding the Language of Literature

UNIT-5: PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17BS2106	
Course Title: ENGLISHPROFICIENCY-I	
CO-1	Improve speaking skills
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts
CO-5	Improve their inter-personal communication skills
CO-6	Be confident in presentation skills.

Regulation: R17							II / IV - B.Tech. II - Semester		
INFORMATION TECHNOLOGY (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Course**	**C**	**Cr**	**L**	**T**	**Lab**	**Internal Marks**	**Exam Marks**	**Total Marks**
B17IT 2201	Computer Organization	ES	3	3	1	--	30	70	100
B17BS2202	Probability, Statistics & Queuing Theory	ES	3	3	1	--	30	70	100
B17IT 2202	Microprocessors	ES	3	3	1	--	30	70	100
B17IT 2203	File Structures	ES	3	3	1	--	30	70	100
B17IT 2204	Unix & Shell Programming	ES	3	3	1	--	30	70	100
B17IT 2205	Formal Language and Automata Theory	ES	3	3	1	--	30	70	100
B17IT 2206	Python Programming Lab	ES	2	--	--	3	50	50	100
B17IT 2207	Digital Electronics And Micro Processors Lab	ES	2	--	--	3	50	50	100
B17IT 2208	Advanced Coding	ES	1	--	--	2	50	---	50
B17BS2204	Professional Ethics & Human Values	BS	--	2	--	--	--	--	--
B17BS2206	English Proficiency-II	BS	--	1	1	--	--	--	--
Total			**23**	**21**	**7**	**8**	**330**	**520**	**850**

*Cr – Credits

C – Category

L – Lecture Hours

T – Tutorial Hours

IM – Internal Marks

EM – Exam Marks

SYLLABUS: COMPUTER ORGANIZATION (B17IT2201)

UNIT-I

Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

UNIT-II

Basic Computer Organization and Micro programmed Control : Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory- Reference Instructions, Input- Output and Interrupt, Complete Computer Description, Design of Basic Computer, Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: Introduction, General Register Organization, Stack Organization,Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC)

UNIT-IV

Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer,Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), SerialCommunication.

UNIT-V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Memory Management Hardware.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17IT2201	
Course Title: COMPUTER ORGANIZATI ON	
CO-1	Knowledge about major components of a computer such as processor, memory and I/O modules along with their interconnections internally with outside world.
CO-2	Detailed idea about architecture of central processing unit, functions of control unit, memory, I/O devices and their issues
CO-3	Simple and multiple processor organization and their issues.

PROBABILITY, STATISTICS AND QUEUING THEORY (B17BS2202)

UNIT -I

Random Variables and Probability functions: Review on basic concepts of Probability (no questions will be set on review), Definition of a random variable, Distribution function, Properties of Distribution Function, Discrete Random Variable, Probability Mass Function, Discrete Distribution Function, Continuous Random Variable, Probability Density Function, Continuous Distribution Function.

Mathematical Expectation: Mathematical Expectation of a Random Variable, Expected Value of function of a Random Variable, Addition Theorem and Multiplication Theorem of Expectation(without proofs), Statistical Measures like Mean, Variance, Moments and Covariance in terms of Expectations.

Generating functions: Moment generating Function, Characteristic Function and Probability generating Function of a Random Variable.

UNIT II

Discrete Distributions: Binomial distribution and Poisson distribution - Definition, Mean, Variance, moments, m.g.f., Characteristic function, p.g.f., fitting of distributions.

Continuous Distributions: Normal Distribution - Definition, Standard Normal Variate, Mean, Variance, m.g.f., Characteristic function Applications of Normal Distribution, Importance of Normal distribution. Exponential Distribution, Definition, Mean, Variance and Memory less property of Exponential distribution.

UNIT III

Curve fitting: Method of least Squares, fitting of a Straight line, Fitting of a Parabola. Correlation: Definition, Karl Pearson"s Coefficient of Correlation, Limits for correlationcoefficient, Rank Correlation, Spearman"s formula for rank correlation coefficient.

Regression Analysis: Regression Lines, Regression Coefficients and their properties (withoutproofs)

UNIT IV

Sampling Theory: Sample, population, statistic, parameter, Sampling distribution, standarderror, point and interval estimation. Testing of Hypothesis: Formulation of Null hypothesis, Alternative hypothesis, Critical region, level of significance, Errors in sampling- Type-I-error, Type-II-error, One-tailed and Two-tailed tests.

Large Sample Theory: Test of significance of single sample proportion, Test of significance fordifference of proportions.

Small Sample Theory: Degrees of freedom, Student's-t-distribution: definition, t-test for singlemean, t-test for difference of means, Paired t-test for difference of means.

F-distribution: definition, F-test for equality of two population variances. Chi-square distribution:definition, Chi-square test for goodness of fit, Chi-square test for Population Variance.

UNIT V

Queuing Theory: Queue description, Birth and Death Process, Distribution of Inter-arrival Times, Distribution of service times, Kendall's representation of a queueing model, Operatingcharacteristics of a queueing model, steady-state solutions of {M/M/1: ∞/FCFS} Model and {M/M/1 ; N/FCFS} Model.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17BS2202	
Course Title: PROBABILITY,STATISTICS ANDQUEUIG THEORY	
CO-1	Identify the random variable as discrete/continuous and analyse it.
CO-2	Predict the distribution suitable for the given data from its moments.
CO-3	Measure the intensity of association between the variables.
CO-4	Fit a best suitable Curve for the given data.
CO-5	Decide the test applicable for giving inference about Population Parameter based on Sample statistic.
CO-6	Make business decisions about the resources needed to provide a service in day-to-day life applications including telecommunication, traffic engineering, computing and the design of factories, shops, offices and hospitals.

SYLLABUS: MICROPROCESSORS (B17 IT 2202)

UNIT I

Introduction to 8085 microprocessor

Internal Architecture functional/signal description of 8085 microprocessor, Instruction set,Addressing modes and programming in 8085.

UNIT II

Programming techniques

Timing diagram, counters and delays, stacks and subroutines and Interrupts in 8085

UNIT III

Memory and I/O

Classification and interfacing semiconductor memories with 8085 MPU.Interfacingcharacteristics of IO devices, IO device addressing methods.

UNIT IV

Peripheral devices and interfacing with 8085. Interfacing peripherals to INTEL 8085: Paraller IO interface-8255, Serial IO Interface-8251, Timer Interface-

8253. Interfacing peripherals to INTEL 8085: Keyboard/Display Interface- 8279, Interrupt controller Interface-8259.

UNIT V

Introduction to 8086 microprocessor and programming

The 8086 Microprocessor architecture, Internal Architecture & functional /signal description of 8086, segmented memory, Maximum 7 Minimum mode of 8086. Introduction set and programming the 8086: Addressing modes, Instruction set and assembly language programming techniques with 8086.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 IT 2202	
Course Title: MICROPROCESSOR I	
CO-1	Student will able to identify microprocessor and microcomputers and will be able to describe 8085 MP architecture and classify instructions.
CO-2	Student will able to state and illustrate 8085 programming techniques and solve code conversions, ISR, subroutines, operations to examine results.
CO-3	Student will able to describe 8086 MP architecture and classify instruction set of 8086
CO-4	Student will able to state and illustrate 8086 programming techniques and solve code conversions, ISR, subroutines, operations to examine results.

SYLLABUS: FILE STRUCTURES

(B17 IT 2203)

UNIT-I: File Processing Operations and Secondary Storage

Physical and logical files, opening, reading & writing and closing files in C, seeking and special characters in files, physical devices and logical files, file-related header files in C. Disks – organization, tracks, sectors, blocks, capacity, non-data overhead, cost of a disk access, magneticTape –types, performance, organization estimation of tape length and data transmission times, diskvs tape, CD-ROM – CD-ROM as a file structure, physical organization, strengths and weaknessof CD-ROMs, storage hierarchy

UNIT-II: Byte Journey and buffer Management and File Structure Concepts

File manager, I/O buffer, I/O processing, buffer strategies and bottlenecks. A stream file, field structures, reading a stream of fields, record structures and that uses a length indicator, Mixing numbers and characters – use of a hex dump, reading the variable length records from the files.

UNIT-III: Managing records in C files and organizing files for performance

Retrieving records by keys, sequential search, direct access, choosing a record structure and recordlength, header records, file access and file organization. Data compression, reclaiming space – record deletion and storage compaction, deleting fixed-length records for reclaiming space dynamically, deleting variable-length records, space fragmentation, replacement strategies.

UNIT-IV: Indexing and Indexed sequential file access and prefix B+ Trees

Index, A simple index with an entry sequenced file, basic operations on an indexed, entry sequenced file, indexes that are too large to hold in memory, indexing to provide access by multiple keys, retrieval using combination of secondary keys, improving the secondary index structure – inverted lists. Indexed sequential access, maintaining a sequence set, adding a simpleindex to the sequence set, the B tree, simple prefix B+ content of the index: separators insteadof keys, the simple prefix tree maintenance, index set block size, internal set block size, internal structure of index set blocks, loading a simple prefix

UNIT-V: Hashing and Extendable hashing

Collisions in hashing, a simple hashing algorithms, hashing functions and record distributions, memory requirements, collision resolution by progressive overflow, buckets, deletions. Working ofextendable hashing, implementation, deletion, extendable hashing performance

Course Outcomes for Second Year Second Semester Course	
Course Code: B17 IT 2203	
Course Title: FILE STRUCTURES	
CO-1	Student will able to identify the basic operations on a file.
CO-2	Student will able to state and illustrate various storage & retrieval mechanisms
CO-3	Student will able to describe various compression methods & advantages of them
CO-4	Student will be able to describe various index structures.
CO-5	Student will able to state and illustrate hashing methods for direct access of data from files

SYLLABUS: UNIX AND SHELL PROGRAMMING (B17IT2204)

UNIT-I:

Introduction to Unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands

UNIT-II:

The File system –The Basics of Files-What‟s in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing theOwner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III:

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs. Filters-The Grep Family-Other Filters-The Stream EditorSed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-IV:

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run DuringStarting-The First Shell Script-The read Command-Positional parameters-The $? Variableknowing the exit Status-More about the Set Command-The Exit Command-Branching ControlStructures-Loop Control Structures-The Continue and Break Statement-The Expr Command:Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-V:

The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foregroundand Background processes-Internal and External Commands-Process Creation-The TrapCommand-The Stty Command-The Kill Command-Job Control.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17IT2204	
Course Title: UNIX AND SHELLPROGRAMMING	
CO-1	Able to working on the basic commands of UNIX operating system.
CO-2	File processing projects will require data organization, problem solving and research
CO-3	Scripts and programs will demonstrate effective use of structured programming.
CO-4	Scripts and programs will be accompanied by printed output demonstrating completion of a test plan
CO-5	Able to understand and handle the process management using system calls

SYLLABUS: PYTHON PROGRAMMING LAB (B17IT2206)
LIST OF PROGRAMS

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user(Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10

c) Write a program using a for loop that loops over a sequence. What is sequence?

d) Write a program using a while loop that asks the user for a number, and prints a countdownfrom that number to zero.

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. Bystarting with 1 and 2, the first 10 terms will be:
1, 2, 3, 5, 8, 13, 21, 34, 55, 89,

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million,find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a program to count the numbers of characters in the string and store them in adictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with adictionary data structure.

Exercise - 6 DS - Continued

a) Write a program combine lists that combines these lists into a dictionary

b) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise – 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) Write a function ball collide that takes two balls as parameters and computes if they arecolliding. Your function should return a Boolean representing whether or not the balls arecolliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius

a. If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
b. Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions - Continued

a) Write a function nearly_ equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
b) Write a function dups to find all duplicates in the list.
c) Write a function unique to find all the unique elements of a list

Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list. Without using the reverse function.
c) Write function to compute gcd, LCM of two numbers. Each function shouldn't exceed one line.

Exercise 11 - Multi-D Lists

a) Write a program that defines a matrix and prints
b) Write a program to perform addition of two square matrices
c) Write a program to perform multiplication of two square matrices

Exercise - 12 - Modules

a) Install packages requests, flask and explore them. using (pip)
b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
c) Write a simple script that serves a simple HTTP Response and a simple HTML Page

Exercise - 13 OOP

Class variables and instance variable and illustration of the self-variable

1. Robot
2. ATM Machine

Exercise - 14 GUI, Graphics

1. Write a GUI for an Expression Calculator using tk
2. Write a program to implement the following figures using turtle

Course Outcomes for Second Year Second Semester Course	
Course Code: B17IT2206	
Course Title: PYTHON PROGRAMMING LAB	
CO-1	Making Software easily right out of the box
CO-2	Experience with an interpreted Language.
CO-3	To build software for real needs
CO-4	Prior Introduction to testing software

SYLLABUS: DIGITAL ELECTRONICS AND MICROPROCESSORS LAB (B17IT2207)

Digital logic design

1. Verification of logic gates with truth tables(AND,OR,NOT,NOR,NAND,XOR)
2. NAND & NOR Implementation for basic gates
3. Design half adder & half subtractor using logic gates.
4. Design full adder & full subtractor using logic gates.
5. Design binary to gray code converter
6. Design 2to 4 line decoder
7. Design 4X1 multiplexer
8. Verification of flip flops and conversions
9. Design shift registers using flip flops.
10. Design ripple up & ripple down counters using flip flops

8085 programs

1. Write an ALP for addition of N numbers
2. Write an ALP for multiplication of two numbers.
3. Write an ALP for copying one array to another
4. Write an ALP for GCD of two numbers
5. Write an ALP for linear search
6. Write an ALP for Fibonacci series
7. Write an ALP for BCD to Binary conversion
8. Write an ALP for Binary to BCD conversion
9. Write an ALP for Bubble sort in ascending/descending order.
10. Write an ALP for division of two numbers.
11. Write an ALP for ASCII to hexadecimal conversion.
12. Write an ALP for hexadecimal to ASCII conversion.
13. Write an ALP for insertion of an element in an array
14. Write an ALP for finding largest/smallest number in an array

8086 programs

1. Write an ALP for addition of N bytes
2. Write an ALP for addition of N words
3. Write an ALP for addition of N signed bytes
4. Write an ALP for multiplication of two numbers.
5. Write an ALP for division of two numbers.
6. Write an ALP for finding largest/smallest number in an array
7. Write an ALP for GCD of two numbers
8. Write an ALP for copying a string
9. Write an ALP for string length
10. Write an ALP for finding string palindrome

Course Outcomes for Second Year Second Semester Course	
Course Code: B17IT2207	
Course Title: DIGITAL ELECTRONICS AND MICROPROCESSORS LAB	
CO-1	Student can examine Digital trainer kit and microprocessor kit
CO-2	Student can calculate logical functions for coders, decoders, multiplexers and counters using digital trainer kits
CO-3	Student can experiment various Arithmetic and logical operations using 8085 instructions
CO-4	Student can experiment various Arithmetic and logical operations using 8086 instructions in MASM assembler.

SYLLABUS: ADVANCED CODING

(B17 IT 2208)

UNIT I Review Coding essentials and modular programming

Introduction to Linear Data, Structure of linear data, Operation logics, Matrix forms andrepresentations, Pattern coding.

Introduction to modular programming: Formation of methods, Methods: Signature anddefinition, Inter-method communication, Data casting & storage classes, Recursions

UNIT II Linear Linked Data

Introduction to structure pointer, Creating Links Basic problems on Linked lists, Classicalproblems on linked lists. Circular Linked lists, Operations on CLL, Multiple links, Operations onDoubly linked lists

UNIT III Abstract Data-structures

Stack data-structure, Operations on stack, Infix/Prefix/Post fix expression evaluations, Implementation of stack

Using array, Implementation of stack using linked lists.

Queue data-structure: Operations on Queues, Formation of a circular queue, Implementation of queue using stack, Implementation of stack using array, Implementation of stack using linked lists

UNIT IV Running time analysis of code and organization of linear list data

Code evaluation w.r.t running time, Loop Complexities, Recursion complexities, Searchingtechniques: sequential Vs. binary searching.

Organizing the list data, Significance of sorting algorithms, Basic Sorting Techniques: Bubblesort, selection sort, Classical sorting techniques: Insertion sort, Quick sort, Merge sort.

UNIT V Standard Library templates and Java collections

Introduction to C++ language features, working on STLs, Introduction to Java as ObjectOriented language, Essential Java Packages, Coding logics.

Note: This course should focus on Problems

Course Outcomes for Second Year Second Semester Course	
Course Code: B17IT2208	
Course Title: ADVANCED CODING	
CO-1	Acquire coding knowledge on essential of modular programming
CO-2	Acquire Programming knowledge on linked lists
CO-3	Acquire coding knowledge on ADT
CO-4	Acquire knowledge on time complexities of different methods
CO-5	Acquire Programming skill on Java libraries and Collections

SYLLABUS: PROFESSIONAL ETHICS & HUMAN VALUES
(B17BS 2204)
(Common to CSE, ECE & IT)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, HumanValues – Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, ProfessionalEthics, Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:

Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:

Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination,Sexual harassment at work place.

UNIT – V

Global Issues:

Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living, concept of Harmony in life.

Course Outcomes for Second Year Second Semester Course	
Course Code: B17BS2204	
Course Title: PROFESSIONAL ETHICS & HUMAN VALUES	
CO-1	By the end of the course student should be able to understand the importance of ethics and values in life and society.

ENGLISH PROFICIENCY-II (B17 BS 2206)

(Common to All Branches

UNIT-1: SPEAKING

Analyzing proverbs

Enactment of One-act play

UNIT-2: READING

Reading Comprehension

Summarizing Newspaper Article

UNIT-3: WRITING

Note Taking &Note Making

Precis Writing

Essay Writing

Letter Writing

Picture Description

Literary Appreciation– Learning the Language of Literature

UNIT-4: VOCABULARY

Indian-origin English Words

Phrasal Verbs for Day-to-Day Communication

Commonly used Idiomatic Expressions

UNIT-5: PROJECT

Research Writing

Course Outcomes for Second Year Second Semester Course	
Course Code: B17BS2206	
Course Title: ENGLISH PROFICIENCY-II	
CO-1	Develop the skills of taking and making notes
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively
CO-4	Learn and practice the skills of Research writing.
CO-5	Communicate well through various forms of writing.

Regulation: R17					III / IV - B.Tech. I - Semester				
INFORMATION TECHNOLOGY (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**Lab**	**IM**	**EM**	**Total Marks**
B17 IT3101	Computer Networks	ES	3	3	1	-	30	70	100
B17 IT3102	E-Commerce	ES	3	3	1	-	30	70	100
B17 IT3103	Compiler Design	ES	3	3	1	-	30	70	100
B17 IT3104	Operating Systems	ES	3	3	1	-	30	70	100
B17 IT3105	Database Management Systems	ES	3	3	1	-	30	70	100
B17 IT3106	Design and Analysisof Algorithms	ES	3	3	1	-	30	70	100
B17 IT3107	Database Management SystemsLab	ES	2	-	-	3	50	50	100
B17 IT3108	Unix and Operating Systems Lab	ES	2	-	-	3	50	50	100
B17BS3101	Problem Solving & Linguistic Competence	BS	1	-	3	-	30	70	100
B17BS3104	Competitive Coding-I	BS	1	-	-	3	50	50	100
Total			**24**	**18**	**9**	**9**	**360**	**640**	**1000**

SYLLABUS: COMPUTER NETWORKS (B17IT3101)

UNIT-I:

Data communication Components and Network models: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT-II:

Data Link Layer and Medium Access Sub Layer: Error Detection – Fundamentals, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Multiple access protocols - CSMA/CD,CDMA/CA.

UNIT-III:

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Uni cast Routing protocols.

UNIT-IV:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP),Transmission Control Protocol (TCP).

UNIT-V:

Application Layer: Domain Name Space (DNS), EMAIL: SMTP, MIME, File Transfer Protocol(FTP), HTTP, Bluetooth

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3101	
Course Title: COMPUTER NETWORKS	
CO-1	Explain the functions of the different layer of the OSI Protocol.
CO-2	Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
CO-3	For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
CO-4	For a given problem related TCP/IP protocol developed the network programming.
CO-5	Configure DNS, EMAIL, File Transfer Protocol (FTP), HTTP, Bluetooth, using open source available software and tools

SYLLABUS: E-COMMERCE (B17IT3102)

UNIT-I

Electronic commerce environment and opportunities: Back ground–The Electronic commerceEnvironment–Electronic Market Place Technologies. Modes of electronic commerce: Overview–EDI–Migration to open EDI–Ecommerce with WWW/Internet– Commerce Net Advocacy–Web commerce going forward.

UNIT-II

Approaches to safe electronic Commerce: Overview– Source–Transport Protocols–Secure Transactions– Secure Electronic Payment Protocol–Secure Electronic Transaction–Certificates for Authentication–Security on Web Servers and enterprise networks.

UNIT-III

Electronic cash and electronic payment schemes: Internet Monitory Payment and Security requirements–payment and purchase order process–online electronic cash.

UNIT-IV

Master card/ Visa Secure electronic transaction: Introduction – Business requirements - Concepts - Payment Processing. Email and Secure Email Technologies for Electronic Commerce: Introduction –The means of Distribution –A model for Message Handling –How Does an Email Work.

UNIT-V

Internet Resources for Commerce: Introduction –Technologies for Web Servers –Internet Applications for commerce – Internet Charges –Internet Access and Architecture–Searching the Internet

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3102	
Course Title: E-COMMERCE	
CO-1	Ability to discuss the e-Commerce process. Describe an example of system architecture for an e-Business. List the seven major elements of web design.
CO-2	Ability to Identify and explain fundamental web site tools including design tools, programming tools, and data processing tools. Identify the major electronic payment issues and options.
CO-3	Ability to discuss security issues and explain procedures used to protect against security threats.
CO-4	Ability to Identify and discuss management issues underlying e-Commerce issues including organizational structure, strategic planning, goal setting, corporate social responsibility, changing market intermediaries, resource allocation and customer service.

SYLLABUS: COMPILER DESIGN (B17IT3103)

UNIT – I

Introduction: Language Processors, the structure of a compiler, the science of building a compiler, programming language basics. Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering,Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From RegularExpressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT - II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars, Parser Generators.

UNIT - III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Intermediate- Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Back patching, Switch-Statements, Intermediate Code for Procedures.

UNIT – IV

Run-Time Environments: Storage organization, Stack Allocation of Space, Access to Nonlocal Dataon the Stack, Heap Management.

Code Generation: Issues in the Design of a Code Generator, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment.

UNIT - V

Machine-Independent Optimizations: The Principal Sources of Optimization, Introduction to Data- Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial RedundancyElimination, Loops in Flow Graphs.

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3103	
Course Title: COMPILER DESIGN	
CO-1	Ability to design, develop, and implement a compiler for any language.
CO-2	Able to use lex and yacc tools for developing a scanner and a parser.
CO-3	Able to design and implement LL and LR parsers.
CO-4	Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
CO-5	Ability to design algorithms to generate machine code

SYLLABUS: OPERATING SYSTEMS
(B17IT3104)

UNIT I:

Introduction to Operating System Concept: Introduction to Computer System Hardware, Types of operating systems, operating systems concepts, operating systems services, Introduction to Interrupts and System calls, System call types, Operating System Structures: Monolithic, Layered, Micro Kernel and Virtual Machine (VM).

UNIT-II:

Process Management – The process, Process State Diagram, Process control block, Context Switching, Process Scheduling- Scheduling Queues, Schedulers, Operations on Processes,Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms. Threads, Threading Issues, Thread Scheduling, Multiple Processors and Scheduling issues.

UNIT-III:

Memory Management: Swapping, Fragmentation, Free Space Management Techniques, ContiguousMemory Allocation, Paging, Structure of the Page Table, Segmentation.

Virtual Memory Management: Virtual Memory, Demand Paging, Page-Replacement Algorithms, Frame Allocation, Thrashing, Pre-Paging.

UNIT-IV:

Inter Process Communication (IPC), Process Synchronization, Race Condition, Critical- Section Problem, Bounded Buffer problem, Critical-Section problem Solutions: Hardware solutions, Peterson's Solution, Semaphores, Monitors, Synchronization solutions for Classic IPC Problems.

Principles of deadlock – System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock

UNIT-V:

File Concept, Access Methods, Directory & Directory structure, Disk Space Allocation methods, Protection mechanisms: Protection Domain, ACL & C-List. Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management. I/O Management, Principles of I/O Software.

Case Study: Basic concepts of LINUX, Windows Operating Systems

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3104	
Course Title: OPERATING SYSTEMS	
CO-1	Evaluate and discriminate various Operating systems and Structures.
CO-2	Explore Design issues of various Process Scheduling algorithms.
CO-3	Apply the principles of concurrency.
CO-4	Select suitable Deadlock handling algorithm
CO-5	Compare and contrast various memory management schemes.
CO-6	Design and Implement a prototype file systems
CO-7	Explore Basic features of Linux and Windows Operating systems.

SYLLABUS: DATA BASE MANAGEMENT SYSTEMS (B17IT3105)

UNIT-I

An Overview of Database Management Systems:

Introduction: What is Database and DBMS, File system vs. DBMS, Data models, Levels of Abstraction, Data Independence, Database system architecture, DBA, Client/Server Architecture, Three Tier Architecture.

The ER Model: Database Design and ER Diagrams-Entities Attributes, and Entity Sets- Relationship and Relationship Sets-other features of ER Model, Conceptual Design with the ER Models.

UNIT -II

The Relational Model: Integrity Constraints Over Relations- Key Constraints –Foreign Key Constraints-General Constraints, Logical Database Design: ER to Relational, Views.

Relational Algebra and Relational calculus: Operators and examples, TRC, DRC.

UNIT-III:

SQL: Queries, Constraints, Triggers: The Form of Basic SQL Query, Union, Intersect, and Except, Nested Queries, Aggregate Operators, Null Values, Triggers, Accessing Databases from applications , Introduction to JDBC.

UNIT-IV:

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT-V:

Transaction Management and Concurrency Control: The ACID properties, transactions and schedules, Concurrent execution of transactions, Lock based concurrency control. Dealing with deadlocks, specialized locking techniques, Concurrency control without locking.

Database Recovery management: The LOG, Write-Ahead log protocol, check pointing, recovering from system crash. Introduction to ARIES,

Course Outcomes for Third Year First Semester Course	
Course Code: B17 IT3105	
Course Title: DATA BASE MANAGEMENT SYSTEMS	
CO-1	Describe a relational database and object-oriented database.
CO-2	Create, maintain and manipulate a relational database using SQL
CO-3	Describe ER model and normalization for database design.
CO-4	Examine issues in data storage and query processing and can formulate appropriate solutions.
CO-5	Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
CO-6	Design and build database system for a given real world problem.

SYLLABUS: DESIGN AND ANALYSIS OF ALGORITHMS (B17IT3106)

UNIT I

Introduction: Algorithm, Algorithm specification, Performance Analysis.

Divide and Conquer: The General Method -- Binary search -- Finding Maximum and Minimum --Merge sort -- Quick sort -- Selection – Strassen's Matrix Multiplication – Convex Hull

UNIT II

The Greedy Method: The General Method – Knapsack Problem -- Job Sequencing with Deadlines -- Optimal Storage on Tapes -- Minimum Cost Spanning Trees: Prim's Algorithm, Kruskal'sAlgorithm –Optimal Merge Patterns-- Single Source Shortest Paths.

UNIT III

Dynamic Programming: The General Method -- Multistage Graphs -- All Pairs Shortest Paths -- Optimal Binary Search Trees –0/1 Knapsack Problem -- Reliability Design -- the Traveling Sales person Problem.

UNIT IV

Basic Traversal and Search techniques: Techniques for Binary trees – Techniques for Graphs – Connected Components and Spanning trees -- Bi-connected Components and Depth First Search.

Back Tracking: The General Method – 8-Queens problem -- Sum of Subsets -- Graph Coloring --Hamiltonian Cycle.

UNIT V

Branch and Bound: The Method -Least Cost (LC) Search, The 15-Puzzle: an Example -- 0/1 Knapsack Problem LC Branch-and-Bound Solution, FIFO Branch-and- Bound Solution-- Traveling sales Person Problem

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3106	
Course Title: DESIGN AND ANALYSIS OF ALGORITHMS	
CO-1	Students will be able to understand, apply and Analyze the algorithms using asymptotic notations and Divide-and-Conquer technique on computer science problems.
CO-2	Student will be able to understand, apply and analyze Greedy technique on computer science problems.
CO-3	Student will be able to understand, apply and analyze Dynamic Programming on computer science problems
CO-4	Student will be able to understand, apply and analyze Basic Traversal and Search techniques and Backtracking on computer science problems.
CO-5	Student will be able to understand, apply and analyze Branch-and-Bound and algebraic problems on computer science problems

SYLLABUS: DATA BASE MANAGEMENT SYSTEMS LAB
(B17IT3107)

List of Experiments:

SQL: Queries to facilitate acquaintance of Built-In Functions, String Functions, Numeric Functions,Date Functions and Conversion Functions.

Queries using operators in SQL

Queries to Retrieve and Change Data: Select, Insert, Delete, and UpdateQueries using Group By, Order By, and Having Clauses

Queries on Controlling Data: Commit, Rollback, and Save pointQueries to Build Report in SQL *PLUS

Queries for Creating, Dropping, and Altering Tables, Views, and ConstraintsQueries on Joins and Correlated Sub-Queries

Queries on Working with Index, Sequence, Synonym, Controlling Access, and Locking Rows forUpdate, Creating Password and Security features.

PL/SQL

Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation

Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL

Write a PL/SQL block using SQL and Control Structures in PL/SQL

Write a PL/SQL code using Triggers.

Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types

Write a PL/SQL Code using Procedures, Functions.

Write a PL/SQL Code Creation of forms for any Information System such as Student Information System, Employee Information System etc.

Demonstration of database connectivity

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3107	
Course Title: DATA BASE MANAGEMENT SYSTEMS LAB	
CO-1	Understand, appreciate and effectively explain the underlying concepts of database technologies.
CO-2	Design and implement a database schema for a given problem-domain normalize a database.
CO-3	Populate and query a database using SQL DML/DDL commands.
CO-4	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
CO-5	Programming PL/SQL including stored procedures, stored functions, cursors, packages.
CO-6	Design and build a GUI application using a 4GL

SYLLABUS: UNIX AND OPERATING SYSTEMS LAB (B17IT3108)

OPERATING SYSTEMS

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Multiprogramming-Memory management-
   Implementation of fork (), wait (), exec() and exit (), System calls
3. Simulate the following
   a) Multiprogramming with a fixed number of tasks (MFT)
   b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms. a) FIFO b) LRU c) LFU
7. Simulate the following File allocation strategies
   a) Sequenced b) Indexed c) Linked

UNIX PROGRAMMING

1. Basic Shell Commands Shell Programs
2. Fibonacci Series
3. Designing Calculator
4. File Operations
5. Base conversion
6. Usage of cut and Filter commands (grep, awk, sed..)
7. Usage of user defined functions Administration
8. Managing User Accounts
9. User Quota Management
10. Installation of RPM software and Zipping, ta

Course Outcomes for Third Year First Semester Course	
Course Code: B17IT3108	
Course Title: UNIX AND OPERATING SYSTEMS LAB	
CO-1	To use Unix utilities and perform basic shell control of the utilities
CO-2	To use the Unix file system and file access control.
CO-3	To use of an operating system to develop software
CO-4	Work confidently in Unix/Linux environment
CO-5	Write shell scripts to automate various tasks
CO-6	Master the basics of Linux administration

PROBLEM SOLVING & LINGUISTIC COMPETENCE (B17BS3101)

(Common to all Branches)

Part-A: Verbal and Soft Skills-I

Grammar: (VA)

Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns- number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause ,conditional and relative clauses), phrases(use of the phrases, phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees of comparison, modifiers, determiners, identifying errors in a given sentence, correcting errors in sentences.

Vocabulary: (VA)

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants(with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meanings ofthe same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning: (VA)

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage: (VA)

Sentence completion (with emphasis on signpost words and structure of a sentence), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:

Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis –Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for GoalSetting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - Stress Management, CV Making and CV Review

Part-B: Quantitative Aptitude –I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, Finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, introducing the concept of ratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work,Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of time and distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.

Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships, shares and dividends Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking, directions Problems of how to find the next number in the series, Finding the missing number and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directions north, south, east, west.

Data sufficiency, Syllogisms Easy sums to understand data sufficiency, Frequent mistakes while doing data sufficiency**,** Syllogisms Problems

SYLLABUS: COMPETITIVE CODING-I

(B17 BS3104)

UNIT I Standard Library templates and Java collections
Introduction to Java as Object Oriented language, Essential Java Packages, Coding logics.

UNIT II The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector.

UNIT III More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT IV GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout. Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events.

UNIT V Adapter classes, Inner classes, Anonymous Inner classes. A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS3104	
Course Title: COMPETITIVE CODING-I	
CO-1	Able to solve problems using java collection framework and I/o classes.
CO-2	Able to develop multithreaded applications with synchronization.
CO-3	Able to develop applets for web applications.
CO-4	Able to design GUI based applications

MECHANICAL ENGINEERING

Regulation: R17			I / IV - B.Tech. I - Semester					
MECHANICAL ENGINEERING (under Choice Based Credit System / Elective Course System)								
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)								
Code No.	**Name of the Subject**	**C**	**Cr**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS1101	English–I	BS	3	3	1	--	30	70	100
B17 BS1102	Mathematics–I	BS	3	3	1	--	30	70	100
B17BS1105	Engineering Chemistry	BS	3	3	1	--	30	70	100
B17ME1101	Engineering Mechanics	ES	3	3	1	--	30	70	100
B17ME1102	Engineering Drawing	ES	3	1	--	3	30	70	100
B17CE1101	Environmental Studies	ES	2	2	1	--	30	70	100
B17 BS1107	Engineering Chemistry Lab	BS	2	--	--	3	50	50	100
B17 BS1108	English Communication Skills Lab–I	BS	2	--	--	3	50	50	100
B17 BS1109	Engineering Workshop &IT Workshop	BS	2	--	--	3	50	50	100
B17 BS1111	Inner Engineering	BS	--	--	--	2	--	--	--
Total			**23**	**15**	**5**	**14**	**330**	**570**	**900**

SYLLABUS: ENGLISH –I (B17 BS 1101)

(Common to all Branches)

Life through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

UNIT-I

People and Places:- Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types- Describing people, places and events-Writing sentences-Self-awareness Self-motivation, Dialogue writing.

UNIT-II

Personality and Lifestyle: -Word quiz–Verbs-Adverbs-Negotiations-Proving yourself-Meeting Carl Jung-Describing yourself- Living in the 21st century- Using your dictionary-Communication-Adaptability.

UNIT-III

Media and Environment: - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User"s Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue- Global warming- Paragraph Writing-Arguing a case Motivation- Problem solving

UNIT-IV

Entertainment and Employment:- One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewing employees- Your first interview- Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

UNIT-V

Work and Business:- A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of IPL: The Inside Story, Mark Zuckerberg: World"s Youngest Billionaire- A conversation about a business idea Pair work: Setting up a new business- Recession- Formal letters-Emails- Reports Professionalism-Ethics, Fill in the blanks.

Course Outcomes for First Year First Semester Course	
Course Code: B17BS1101	
Course Title: ENGLISH-I	
CO-1	Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
CO-2	Gain confidence and competency in vocabulary and grammar.
CO-3	Listen, speak, read and write effectively in both the academic and non- academic environment.
CO-4	Extend his/her reading skills towards literature.
CO-5	Strengthen his/her analytical and compositional skills.

SYLLABUS: MATHEMATICS –I (B17 BS 1102)

(Common to all Branches)

UNIT I: Differential equations of first order and first degree:

Linear, Bernoulli, Exact, Reducible to exact types. Applications: Newton"s Law of cooling, Law of natural growth and decay, orthogonal trajectories, Simple electrical circuits, Chemical reactions.

UNIT II: Linear differential equations of higher order:

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type e ax, sin ax, cos ax, polynomials in x, eaxV(x), xV(x), Method of Variation of parameters. Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:

Laplace transforms of standard functions, transforms of tf(t), f(t)/t, properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof). Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT IV: Partial differentiation:

Introduction, Homogeneous functions, Euler"s theorem, Total derivative, Chain rule, which variable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign. Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange"s method (with constraints)

UNIT V: First order and higher order partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit"s method). Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type eax+by, sin (ax+by), cos (ax+by), xm y n.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1102	
Course Title: MATHEMATICS-I	
CO-1	Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newtons law of cooling, orthogonal trajectories and simple electrical circuits.
CO-2	Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion
CO-3	Determine Laplace transform and inverse Laplace transform of various functions
CO-4	Use Laplace transforms to solve a linear ODE.
CO-5	Calculate total derivative, Jocobian and maxima/minima of functions of two variables.

SYLLABUS: ENGINEERING CHEMISTRY (B17 BS 1105)

(Common to CIV, EEE&ME)

UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:

PolymerizationDefinition,TypesofPolymerization,Mechanismofadditionpolymerization,Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding ofplastics,Fabricationofplastics(4techniques);Preparation,PropertiesandapplicationsofPolyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiberreinforcedplastics,conductingpolymers,BiodegradablePolymers-PHBV,Nylon2,Nylon6.Naturalrubber–Vulcanization–CompoundingofRubber;Preparation,propertiesandapplicationsof Buna– S; Buna– N;

UNIT-II: Fuel Technology& Lubricants:

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination of Calorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann"s by-product coke oven process; Refining of Petroleum, Knocking-octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG, CNG.

Lubricants: -Definition, Mechanism of Lubrication, Properties of Lubricants (Definition and significance)

UNIT-III: Electrochemical cells and Corrosion:

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells-Hydrogen–Oxygen cell, Lithium battery Theories of corrosion (i)dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings-metallic coatings–Galvanizing, Tinning, Electroplating; Electrroless plating; Paints.

UNIT-IV: Water technology:

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boilertroubles–sludgeandscaleformation,Boilercorrosion,causticembrittlement,Primingandfoaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

UNIT-V: Chemistry of Engineering Materials &Advanced Engineering materials

Cement: -Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories:-Definition, Characteristics, classification, Properties and failure of refactories. Solar Energy:-Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi-Conductors, Classification and chemistry of semiconductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals:-Definition–Classification with examples –Applications

Course Outcomes for First Year First Semester Course	
Course Code:B17 BS 1105	
Course Title: ENGINEERING CHEMISTRY	
CO-1	At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Students gained Knowledge reasons for corrosion and some methods of corrosion control.
CO-4	Students understands the impurities present in raw water, problems associated with them and how to avoid them.
CO-5	Similarly students understand liquid crystals and semi-conductors. Students can gain the building materials, solar materials, lubricants and energy storage devices.

SYLLABUS: NGINEERINGMECHANICS (B17 ME 1101)
(Common to CIV, EEE &ME)

UNIT-I

Basic Concepts:

Scalar and vector quantities- Representation of vectors- Free vector force, Specification of force-Effect of force on rigid body- Free body diagram. Concurrent Forces in a plane: Principles of statics-Resolution and Composition of forces in a plane-Equilibrium of concurrent forces in a plane- Method of projections-Equilibrium of three forces in a plane Method of moments. Parallel Force system in a plane.

UNIT-II

Centroid & Moment of Inertia: Centroid & M.I – Arial & Mass M.I – Radius of Gyration, Parallel axis–Perpendicular axis theorem–Simple Problems.

UNIT-III

General Case of Forces in a Plane: Resultant and equilibrium of general case of forces in a plane, statically determinate plane trusses-Method of joints and Method of sections.

Friction – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.

UNIT-IV

DynamicsofParticles-RectilinearMotion–Kinematics,D‟Alembert‟sprinciple,Kinetics–Work&Energy–ImpulseMoment, Direct Central Impact –coefficient of restitution.

Curvilinear Motion – Kinematics, Projectile Motion, Moment of momentum, Work & Energy in Curvilinear motion.

UNIT-V

Dynamics of Rigid Bodies - Rigid body rotation – Kinematics - Kinetics – Work & Energy in Rigid body rotation, Plane Motion – Kinematics – Instantaneous center of rotation, Kinetics -Work-Energy principle in plane motion.

Course Outcomes for First Year First Semester Course	
Course Code:B17 ME 1101	
Course Title: ENGINEERING MECHANICS	
CO-1	Determine the resultant of the given force systems.
CO-2	Analyze force systems using equations of equilibrium.
CO-3	Determine centroid, center of gravity and moment of inertia of areas and bodies.
CO-4	Analyze trusses and simple beams.
CO-5	Distinguish between kinematics and kinetics.
CO-6	Apply the work energy and impulse momentum methods of various engineering problems.

SYLLABUS: ENGINEERINGDRAWING

(B17 ME 1102)

(Common to CIV, EEE &ME)

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents &normal for the curves.

UNIT II

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes(HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces-HT, VT

UNIT III

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT V

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Course Outcomes for First Year First Semester Course	
Course Code: B17 ME 1102	
Course Title: ENGINEERING DRAWING	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Construct polygons and engineering curves.
CO-3	Draw projections of points, lines, planes and solids.
CO-4	Represent the object in 3D view through isometric views.
CO-5	Convert the isometric view to orthographic view and vice versa.

SYLLABUS: ENVIRONMENTAL STUDIES

(B17 CE 1101)

(Common to all Branches)

UNIT– I

Global Environmental Crisis:

Environmental Studies-Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

Ecosystems:

Basic Concepts-Structure and Functions of Ecosystems: Producers, Consumers and Decomposers. Types of Ecosystems: Forest Ecosystems, Grass land Ecosystems Desert Ecosystems and Aquatic Ecosystems

UNIT-II

Bio diversity:

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

UNIT-III

Environmental and Natural Resources Management:

Land Resources: L and degradation, soil erosion and desertification, Effects of modern agriculture. Forest Resources: Use and over exploitation-Mining and Dams-their effects on forest and tribal people. Water resources: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

UNIT-IV

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, MarinePollution,Thermalpollution,Noisepollution,NuclearHazards;ClimatechangeandGlobalwarming,Acidrai nandOzonelayerdepletion.SolidWasteManagement:Composting,Vermiculture,Urban and Industrial Wastes, Recycling and Reuse.

Environmental Problems in India:

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Water shed management.

UNIT-V

Institutions and Governance:

Regulations by Government-Environmental Protection Act, Air (Prevention &Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

Case Studies:

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi(Anna Hazare),Kolleru lake –Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

Field Work:

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Affluent Treatment Plants.

Course Outcomes for First Year First Semester Course	
Course Code:B17 CE 1101	
Course Title: ENVIRONMENTAL STUDIES	
CO-1	To bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
CO-3	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
CO-4	Safe guard against industrial accidents particularly nuclear accidents
CO-5	Constitutional provisions for the protection of natural resources

SYLLABUS: ENGINEERING CHEMISTRY LAB (B17 BS 1107)
(Common to CIV, EEE&ME)
LISTOFEXPERIMENTS

Introduction to chemistry Laboratory

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by$KMnO_4$.
4. Estimation of oxalic acid by$KMnO_4$
5. EstimationofMohr‟ssaltby$K_2Cr_2O_7$
6. Estimation of Dissolved oxygen by Winkler‟s method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductrometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formal dehyde resion.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1107	
Course Title: ENGINEERING CHEMISTRY LAB	
CO-1	An understanding of Professional and develop confidence on recent trends.
CO-2	Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipments.
CO-3	Acquire ability to apply knowledge of chemistry.
CO-4	Exposed to the real time working environment.
CO-5	Demonstrate the ability to learn Principles, design and conduct experiments.
CO-6	Ability to work on laboratory and multidisciplinary tasks.

SYLLABUS: ENGLISH COMMUNICATION SKILLS LAB-I (B17 BS 1108)
(Common to All Branches)

- WHY study Spoken English?
- Making Inquiries on the phone, thanking and responding to Thanks –Practice work.
- Responding to Requests and asking for Directions-Practice work.
- Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- Apologising, Advising, Suggesting, Agreeing and Disagreeing-Practice work.
- Letters and Sounds-Practice work.
- The Sounds of English-Practice Work
- Pronunciation
- Stress and Intonation- Practice work.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1108	
Course Title: ENGLISH COMMUNICATION SKILS LAB- I	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students improve their speaking skills in real contexts.
CO-3	Students learn standard pronunciation and practice it daily discourse.
CO-4	Students give up their communicative barriers.

SYLLABUS: ENGINEERING WORKSHOP &IT WORKSHOP (B17 BS 1109)

(Common to CIV, EEE&ME)

PART-A ENGINEERING WORKSHOP

Carpentry	Fitting
1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint	1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit
Black Smithy	**Tin Smithy**
1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt	1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel
House Wiring	
1. Parallel/ Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance	

Note: Atleast two exercises to bed one frame ach trade.

PARTB: IT WORKSHOP:
LISTOFEXCERCISES

1. System Assembling, Disassembling and identification of Parts / Peripherals

2. Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.

3. MS-Office / Open Office

a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.

b) Spread Sheet - organize data, usage of formula, graphs, charts.

c) Power point - features of power point, guidelines for preparing an effective presentation.

d) Access- creation of database, validate data.

4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.

5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene.

6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

7. MATLAB- basic commands, subroutines, graph plotting.

8. LATEX-basic formatting, handling equations and images

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1109	
Course Title: ENGINEERING WORKSHOP & IT WORKSHOP	
	PART-A (ENGINEERING WORKSHOP)
CO-1	Use various tools to prepare basic carpentry and fitting joints.
CO-2	Prepare jobs of various shapes using black smithy.
CO-3	Make basic house wire connections.
CO-4	Fabricate simple components using tin smithy.
	PART-B (IT WORKSHOP)
CO-1	Understand the basic components and peripherals of a computer.
CO-2	To become familiar in configuring a system.
CO-3	Learn the usage of productivity tools.
CO-4	Acquire knowledge about the netiquette and cyber hygiene.
CO-5	Get hands on experience in trouble shooting a system

SYLLABUS: INNER ENGINEERING (B17 BS 1111)
(Common to CIV, EEE &ME)

UNIT-I

YES!+ Workshop: Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in the present Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

UNIT-II

YES!+ Workshop: Yoga Postures (Suryanamaskars) – Giving 100% in everything – Time management – Happiness point – Opposite Values – Pranayama – Sudarshan kriya

UNIT-III

YES!+ Workshop: Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life – Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

UNIT-IV

Creative Arts: Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

UNIT-V

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – Public Speaking– Art of Teaching.

Course Outcomes for First Year First Semester Course	
Course Code: B17 BS 1111	
Course Title: INNER ENGINEERING	
CO-1	To improve his concentration levels and improve his public speaking abilities.
CO-2	To balance his academic and non-academic activities (Work Life Balance).
CO-3	To widen his vision and increase his breadth of perspective in his journey of 4 years.
CO-4	To improve his communications skills, leadership, teamwork and decision-making abilities
CO-5	To inculcate creativity & innovation, planning & organizing as part of their life.
CO-6	Taking responsibility for themselves and people around them.
CO-7	To make their journey more fun and enjoyable.

Regulation: R17				I / IV - B.Tech. II- Semester					
MECHANICAL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17 BS1201	English– II	BS	3	3	1	--	30	70	100
B17 BS1202	Mathematics–II	BS	3	3	1	--	30	70	100
B17 BS1203	Mathematics–III	BS	3	3	1	--	30	70	100
B17 BS1204	Engineering Physics	BS	3	3	1	--	30	70	100
B17 CS1201	Computer Programming Using C	ES	3	3	1	--	30	70	100
#DS 1	Department Subject	ES	3	3	1	--	30	70	100
B17 BS1206	Engineering Physics Lab	BS	2	--	--	3	50	50	100
B17 BS1208	English Communication Skills Lab – II	BS	2	--	--	3	50	50	100
B17 CS1204	C Programming Lab	ES	2	--	--	3	50	50	100
B17 BS1210	Engineering Physics Virtual Labs-Assignments	BS	--	--	--	2	--	--	--
B17 BS1211	NCC	BS	--	--	--	2	--	--	--
Total			**24**	**18**	**6**	**13**	**330**	**570**	**900**

#DS1	CIVIL	B17 CE1201	Building Materials and Construction
	EEE	B17 EE 1201	Circuit Theory
	MECHANICAL	B17 EE 1202	Basic Electrical and Electronics Engineering

SYLLABUS: ENGLISH –II (B17 BS 1201)

(Common to all Branches)

UNITI:

Detailed-Text: Unit1:'

1. The Greatest Resource-Education'
2. Non-Detailed Text: Lesson1: 'APJAbdul Kalam' from the Great Indian Scientists.

UNITII:

Detailed-Text: Unit2:'

1. A Dilemma'
2. Non-Detailed Text: Lesson2:'CVRaman'fromtheGreatIndianScientists.

UNITIII:

1. Detailed-Text:Unit3:'CulturalShock':AdjustmentstonewCulturalEnvironments
2. Non-Detailed Text: Lesson3:'HomiJehangirBhabha'fromtheGreat Indian Scientists.

UNITIV:

1. Detailed-Text:Unit4:'TheLottery'
2. Non-Detailed Text: Lesson4:'JagadishChandraBose'fromtheGreat Indian Scientists.

UNITV:

1. Detailed-Text: Unit 5:'TheChiefSoftwareArchitect'
2. Non-DetailedText:Lesson5:'PrafullaChandraRay'fromtheGreatIndianScientists

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1201	
Course Title: ENGLISH – II	
CO-1	To comprehend the speech of people belonging to different backgrounds and regions.
CO-2	Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
CO-3	To express fluently and accurately in social discourse.
CO-4	Participate in group activities like role-plays, discussions and debates.
CO-5	Identify the discourse features, and improve intensive and extensive reading skills.

SYLLABUS: MATHEMATICS –II (B17 BS 1202)

(Common to CIV, EEE &ME)

UNIT I: Solution of Algebraic and Transcendental Equations:
Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

UNIT II: Interpolation:
Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backward differences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton"s formulae for interpolation, Interpolation with unequal intervals, Lagrange"s interpolation formula.

UNIT III: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule, Simpson"s 1/3rd and 3/8th rules, Solution of ordinary differential equations by Taylor series method, Picard"s method of successive approximations, Euler"s method, Runge-Kutta methods (second order and fourth order).

UNIT IV: Fourier series:
Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet"s conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval"s formula.

UNIT V: Fourier Transforms:
Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval"s identities, Finite Fourier transforms.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1202	
Course Title: MATHEMATICS – II	
CO-1	Find a real root of algebraic and transcendental equations using different methods
CO-2	Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
CO-3	Evaluate numerically certain definite integrals applying Trapezoidal and Simpson"s rules.
CO-4	Solve a first order ordinary differential equation by Euler and RK methods.
CO-5	Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
CO-6	Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

SYLLABUS: MATHEMATICS –III (B17 BS 1203)

(Common to all Branches)

UNIT I: Linear systems of equations:

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.

Applications: Finding the current in electrical circuits.

UNIT II: Eigen values - Eigen vectors and Quadratic forms: Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form. Applications: Free vibration of a two-mass system

UNIT III: Multiple integrals:

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes. Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function

UNIT IV: Vector Differentiation:

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, second order operators, vector identities.

UNIT V: Vector Integration:

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

Course Outcomes for First Year Second Semester Course	
Course Code:B17 BS 1203	
Course Title: MATHEMATICS – III	
CO-1	Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
CO-2	Determine Eigen values and Eigen vectors of a given matrix Reduce a Quadratic form to its canonical form and classify.
CO-3	Evaluate double integrals over a region and triple integral over a volume.
CO-4	Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
CO-5	Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
CO-6	Evaluate line, surface and volume integrals by the use of Green"s, Stokes" and Gauss divergence theorems.

ENGINEERINGPHYSICS (B17 BS 1204)

(Common to CIV,EEE &ME)

UNIT I: Interference and Diffraction

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton‟s rings-Michelson‟s interferometer. Fraunhoffer‟s diffraction at single slit, Diffraction grating-Resolving power of a grating.

UNIT- II: Lasers and Optical Fibers

Introduction, Spontaneous emission and Stimulated emission – Einstein‟s relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser Applications. Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applicationsof fiber.30

UNIT- III: Electro Magnetic Fields and Ultrasonics

Concept of Electromagnetic induction , Faraday‟s law, Lenz‟s law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere‟s law, Maxwell‟s equations and their significance (without derivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics Applications of Ultrsonics.

UNIT- IV: Quantum Mechanics and Band Theory of Solids

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function significance-Schrodinger‟s time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands of crystalline solids-Distinction between Conductors, Semi-conductors and insulators.

UNIT-V: Crystallo Graphy and Nano Materials

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC ,FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals Bragg‟s law.

Introduction to Nano materials – Synthesis methods: Condensation, ball milling, sol-gel, Chemical vapour deposition methods, properties and applications.

Course Outcomes for First Year Second Semester Course	
Course Code:B17 BS 1204	
Course Title: ENGINEERING PHYSICS	
CO-1	Learn the basic concepts of interference and diffraction of light and its applications.
CO-2	Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
CO-3	Understand the inter relationship of electric and magnetic fields and learn ultrasonic‟s as a tool for technological applications
CO-4	Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
CO-5	Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

SYLLABUS: COMPUTER PROGRAMMING USING C (B17 CS 1201)
(Common to CIV, EEE&ME)

UNIT I: Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux Introduction: Computer systems, Hardware and Software Concepts. Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and high level languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling(gcc), Linking and Executing in under Linux. BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:

Unit objective: understanding branching, iteration and data representation using arrays SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples. ITERATIVE: loops- while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest. 32 ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. STRINGS: concepts, c strings.

UNIT III:

Objective: Modular programming and recursive solution formulation FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions

UNIT IV:

Objective: Understanding pointers and dynamic memory allocation POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:

Objective: Understanding miscellaneous aspects of C

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, type def, bit-fields, program applications

BIT-WISE OPERATORS: logical, shift, rotation, masks. Objective: Comprehension of file operations

FILE HANDLING: Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1201	
Course Title: COMPUTER PROGRAMMING USING C	
CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs in C language.
CO-3	Use different data types in a computer program.
CO-4	Design programs involving decision structures, loops and functions.
CO-5	Explain the difference between call by value and call by reference
CO-6	Understand the dynamics of memory by the use of pointers
CO-7	Use different data structures and create/update basic data files.

SYLLABUS: BUILDING MATERIALS AND CONSTRUCTION
(B17 CE 1201)
(For CIVIL)

UNIT I: STONES, BRICKS AND CLAY PRODUCTS Stones: Classification of stones, Properties of building stones, Stone quarrying, precautions in blasting Bricks: Classification of Bricks, Manufacture of Bricks, general qualities of Bricks as per IS code, tests for good bricks as per IS code, including field tests. Clay Products: Tiles-types, manufacturing and their uses, Earth-wares, Terra-cotta, stone ware, Porcelain..

UNIT II: WOOD, WOOD BASED PRODUCTS Wood: cross section details of trees, their general properties, characteristics of good timber defects in timber, mechanical properties of timber, seasoning and its importance, Decay of timber, Wood based Products: Veneers, Plywood and its types, Manufacturing of plywood, plywood grades as per IS code, Laminated wood, merits of plywood and laminated wood, Lamin Boards, Block boards, Batten board, Particle boards

UNIT III: LIME, CEMENT& AGGREGATES

Lime: Various ingredients of lime, Constituents of lime stone, classification of lime , Cement: Natural and artificial cements, types of artificial cements and their uses, Wet and dry process of manufacturing ordinary Portland cement (OPC), composition of cement, Various field and Laboratory tests on OPC as per IS code, Storage of cement. Aggregates: Classification of aggregate – Coarse and fine aggregates, Particle shape and Texture, Specific gravity, Bulk density, porosity and Absorption, Moisture content of Aggregate – Bulking of sand, Sieve analysis.

UNIT IV: FINISHINGS, MASONRYAND FOUNDATIONS

Finishings: Paints and Varnishes: Constituents and characteristics of paints, types of paint and their uses, painting defects, causes and remedies. Constituents of varnishes, types of varnish and their uses, Pointing and Plastering. Masonry: Different types of Stone Masonry- Plan, Elevation, Sections of stone Masonry works- Brick Masonry- Different Types of Bonds- Plan, Elevation and section of Brick Bonds upto Two-Brick wall thickness- Partition walls- Different types of Block Masonry- Hollow concrete Blocks- FAL-G Blocks, Hollow Clay Blocks. Foundations: Types- strip, isolated, strap, combined footings, Raft-Mat- flat slab and Beam raft, box type raft.

UNIT V: ROOFING, FORM WORK& SCAFFOLDING

Roofing: Mangalore tiled roof, RCC roof, Madras terrace roof, Hollow tiled roof, Asbestos cement, Fibre glass, Aluminum G.I. Sheet roofing"s. Form work, Scaffolding: form work types of formwork, centering-scaffolding-types of scaffolding. Trusses: Types- King post and queen post trusses and their uses. Stair cases: Various types of stair cases- dog legged, quarter landing, spiral stairs etc.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1201	
Course Title: CIRCUIT THEORY	
CO-1	Various electrical networks in presence of active and passive elements.
CO-2	Electrical networks with network topology concepts.
CO-3	Magnetic circuit with various dot conventions.
CO-4	R, L, C network with sinusoidal excitation.
CO-5	Three phase AC circuits.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B17 EE 1202)
(For ME)

UNIT I: Electrical and Magnetic Circuits: Basic definitions, Types of network elements, Ohm"s Law, Kirchhoff"s Laws, Series and parallel Circuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday"s laws, Lenz"s law, statically induced EMF, dynamically induced EMF.

UNIT-II: DC Machines: Principle of operation of DC generator- EMF equation-Types of DC Generators-DC motor Types-Torque equation-Applications-Swinburne"s Test, Speed control methods.

UNIT-III: Transformers: Principle of operation of Single phase Transformers- EMF equation-losses-OC and SC Tests Efficiency and Regulation.

UNIT-IV: AC Machines: Principle of operation of Three phase Induction motor-Slip-Torque characteristics-Efficiency applications- Principle of operation of Alternator-EMF equation, Regulation of alternator by synchronous Impedance method. 38

UNIT-V: Diodes-Rectifiers and Transistors: PN junction diode-Forward bias and reverse bias operation, V-I characteristics-Diode applications (Half wave, Full wave and bridge rectifier), Zener diode. PNP and NPN junction Transistors, Transistor as an amplifier, single stage CE amplifier, Frequency response of CE amplifier.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 EE 1202	
Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	
CO-1	Able to analyze the various Electrical networks and understand the basics of Magnetic Circuits.
CO-2	Able to understand the operation of DC generators, 3-Point starter and conduct the Swinburne"s test.
CO-3	Able to analyze the Performance of Transformers.
CO-4	Able to explain the operation of three phase induction motors and alternator.
CO-5	Able to analyze the operation of Half-wave and Full-wave rectifiers and single stage CE amplifier.

SYLLABUS: ENGINEERING PHYSICS LAB (B17 BS 1206)

(Common to CIV,EEE & ME)

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LIST OF EXPERIMENTS
(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton"s rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde"s experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee"s apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young"s modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck"s constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1206	
Course Title: ENGINEERING PHYSICS LAB	
CO-1	Students get hands on experience in setting up experiments and using the Instruments/equipment individually.
CO-2	Get introduced to using new/ advanced technologies and understand their significance.

SYLLABUS: ENGLISH COMMUNICATION SKILSLAB-II (B17 BS 1208)
(Common to All Branches)

1. WHY study Spoken English?
2. Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
3. Responding to Requests and asking for Directions - Practice work.
4. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
5. Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
6. Letters and Sounds-Practice work.
7. The Sounds of English-Practice Work
8. Pronunciation
9. Stress and Intonation-Practice work.

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1208	
Course Title: ENGLISH COMMUNICATION SKILS LAB- II	
CO-1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	Students enhance their presentation skills.
CO-3	Students participate in group discussions and improve their team skills.
CO-4	Students confidently face the interviews.

SYLLABUS: C PROGRAMMING LAB (B17 CS 1204)
(Common to CIV, EEE & ME)
List of Programs

Exercise - 1 Basics

a) What is an OS Command, Familiarization of Editors - vi, Emacs

b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man

c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers

From Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion

b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a) Write a C Program to Find Whether the Given Year is a Leap Year or not.

b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a) Write a C Program to Find Whether the Given Number is

i) Prime Number

ii) Armstrong Number

b) Write a C program to print Floyd Triangle

c) Write a C Program to print Pascal Triangle.

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values.

b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

Exercise – 6 Control Flow – III)

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using Switch case

b) Write a C Program to convert decimal to binary and hex (using switch call function the Function)

Exercise – 7 Functions - Continued

Write a C Program to compute the values of sin x and cos x and e^x values using Series Expansion. (Use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure

b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

i) copy

ii) concatenate

iii) length

iv) compare

b) Implementation of string manipulation operations without library function.

i) copy

ii) concatenate

iii) length

iv) compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents onscreen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)

b) The Lab record must be a print of the LATEX (.tex) Format**.**

Course Outcomes for First Year Second Semester Course	
Course Code: B17 CS 1204	
Course Title: C PROGRAMMING LAB	
CO-1	Apply and practice logical ability to solve the problems.
CO-2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment**.**
CO-3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs**.**
CO-4	Understand and apply the in-built functions and customized functions for solving the problems.
CO-5	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
CO-6	Document and present the algorithms, flowcharts and programs in form of user manuals**.**
CO-7	Identification of various computer components, Installation of software

SYLLABUS: ENGINEERING PHYSICS-VIRTUALLABS–ASSIGNMENTS (B17 BS 1210)
(Common to CIV, EEE &ME)

List of Experiments

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster"s angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson"s interferometer
13. Black body radiation

URL:www.vlab.co.in

(Note: Internal Marks of Engineering Physics - Virtual Labs – Assignments are to be considered as Assignment marks in the Internal Marks of Engineering Physics- B17 BS 1204)

Course Outcomes for First Year Second Semester Course	
Course Code: B17 BS 1210	
Course Title: ENGINEERINGPHYSICS-VIRTUALLABS–ASSIGNMENTS	
CO	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

NCC (B17 BS 1211)
(Common to CIV, EEE & ME)

The NCC- National Integration and Awareness- Drill- Personality Development Life Skills-Leadership-Disaster Management-Social Awareness and Community Development- Health and Hygiene-Environment Awareness and Conservation.

(**Note**: It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

Regulation: R17						II / IV - B.Tech. I- Semester			
MECHANICAL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Course**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**Exam Marks**	**Total Marks**
B17 BS2101	Mathematics-IV		3	3	1	--	30	70	100
B17ME2101	Strength of Materials		3	3	1	--	30	70	100
B17ME2102	Thermodynamics		3	3	1	--	30	70	100
B17ME2103	Manufacturing Process		3	3	1	--	30	70	100
B17ME2104	Metallurgy &Materials Science		3	3	1	--	30	70	100
B17ME2105	Advanced Engineering Drawing		3	2	--	4	30	70	100
B17ME2106	Mechanical Engineering Lab		2	--	--	3	50	50	100
B17EE2107	Basic Electrical &Electronics Engineering Lab		2	--	--	3	50	50	100
B17ME2107	AutoCAD		1	--	--	2	50	--	50
B17 BS2107	English Proficiency-I		--	1	1	--	--	--	--
B17 BS2108	Professional Ethics &Human Values		--	2	--	--	--	--	--
Total			**23**	**20**	**6**	**12**	**330**	**520**	**850**

SYLLABUS: MATHEMATICSIV (B17BS2101)

(Common to CE, ECE, EEE&ME)

UNIT-I Functions of a Complex Variable

Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of zn, ez, sin z, sinh z and log z (no questions may be set).

Limit and continuity of a function of the complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, finding an analytic function, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: the transformations defined by w = z+c, w = cz, w = 1/z, the Bilinear transformation, w = z2 and w = ez

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UNIT-II Applications of Partial Differential Equations

Method of separation of variables, One –dimensional wave equation, the D‟‟Alembert‟‟s solution, one-dimensional heat equation, two-dimensional heat flow in steady state (solution of two-dimensional Laplace equation in Cartesian coordinates only)

UNIT-III Difference Equations And Z-Transforms

Formation of a difference equation, Rules for finding complimentary function and particular integral for linear difference equations. Definition of Z- transform, some standard Z- transforms, properties, transform of a function multiplied by n, initial value theorem and final value theorem(without proof), evaluation of inverse Z- transforms, convolution theorem (without proof), solution of linear difference equations by the use of Z-transforms.

UNIT-IV Probability Distributions

Binomial distribution, Poisson distribution, Normal distribution: Definition (pmf/pdf), notation, mean, variance, moment generating function, probability generating function and fitting of a distribution.

UNIT-V Sampling Theory

Sampling theory: Sampling distribution, standard error, testing of Hypothesis, level of significance, confidence limits, simple sampling of attributes, sampling of variables, estimation of mean and variance.

Large samples: testing of hypothesis for sample proportion, two proportions, single mean and two means.

Small samples: Degrees of freedom, Students‟‟ t- distribution, t-test for single mean, two means; Chi-squared distribution-testing the goodness of a fit.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2101	
Course Title: Mathematics-IV	
CO-1	Using the concept of Analytic function in applications including Electrostatics and Fluid dynamics.
CO-2	Finding theoretical solution of certain Elliptic, Parabolic and Hyperbolic partial differential equations.
CO-3	Using Z-transforms to solve linear difference equations with constant coefficients.
CO-4	Fitting of probability frequency distribution to a given data.
CO-5	Using the concepts of sampling theory to analyze data related to some large and small samples.

SYLLABUS: STRENGTH OF MATERIALS (B17 ME 2101)

UNIT-I

Simple Stresses: Stress, Strain, Stress-Strain curve, Lateral strain, Bars of varying cross-section, Compound bars, Temperature stresses in bars, Modulus of Rigidity, Complementary Shears.

Complex Stresses: Stresses acting on an inclined plane under uniaxial and biaxial state of stress, Principal planes and Principal stresses, Mohr‟s circle for biaxial stresses.

UNIT-II

Shear Forces and Bending Moments: Beam - Types of loads, Types of supports, types of beams, Shear Force and Bending Moment, S.F. and B.M. diagrams for cantilever, simply supported and over hanging beams loaded with point loads, Uniform Distributed loads and Moments, Relationship between Rate of Loading, Shear Force and Bending Moment.

UNIT-III

Stresses in Beams: Theory of bending, Flexural formula, Determination of bending stresses section modulus of rectangular, circular, I, and T sections, Determination of simple beam sections, Shear stresses in beams, shear stresses distribution across various beams sections like rectangular, circular, I and T.

UNIT-IV

Elastic Constants and Stain Energy: Bulk modulus, Relationship between elastic constants, Strain energy, Impact Load. Torsional Stresses in Shafts: Analysis of torsional stresses, Power transmitted, combined bending and torsion

UNIT-V

Thin Cylinders and Spherical Shells: Stresses and strains in thin cylinders, thin spherical shell- derivation for longitudinal and circumferential stresses and volumetric strains.

Thick Cylinders: Lame‟s equation- Cylinders subjected to inside and outside pressures compound cylinders.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2101	
Course Title: Strength of Materials	
CO-1	Understanding the concepts and determining the stress and strain of simple structures.
CO-2	Locating the Principal Planes and determining the Principal Stresses.
CO-3	Determining Shear Forces and Bending Moments of determinate beams.
CO-4	Determining the distribution of Bending and Shear Stresses of beams.
CO-5	Finding relation between elastic constants. Determining shear stresses due to torsion.
CO-6	Determining stresses in Thin Cylindrical and Spherical shells and Thick Cylinders

SYLLABUS: THERMODYNAMICS (B17 ME 2102)

UNIT– I

Introduction: Basic Concepts: System, boundary, Surrounding, control volume, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Work and Heat, Point and Path function. Zeroth law of thermodynamics, Concept of equality of temperatures- Equation of state- Universal gas constant.

UNIT – II

First law of thermodynamics: Joule"s experiments-First law of thermodynamics- Isolated
systems and steady flow systems- Specific heats at constant volume and pressure – Enthalpy First law applied to flow systems- Systems undergoing a cycle and change of state- First law applied to steady flow processes-various non-flow processes-Properties of end states- Heat transfer and work transfer- Change in internal energy-throttling and free expansion- Flow processes- Deviations from perfect gas model-Vanderwall"s equation of state Compressibility charts- Variable specific heats

UNIT – III

Second law of thermodynamics-Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot"s principle, Carnot cycle and its specialties, Clasius theorem Clausius Inequality, Entropy, Principle of Entropy Increase –Third Law of Thermodynamics

UNIT – IV

Air standard Cycles-Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericcson Cycle, brayton cycle – Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – Comparison of Otto Diesel and Dual cycles based on same compression ratio- same maximum pressure and same maximum temperature.

UNIT – V

General Relations, Availability and Unavailability-Helmholtz function and Gibbs function, Maxwell"s equations- Tds relations, relation between specific heats, Available energy, unavailable energy, Available and unavailable forms of energy for a flow and nonflow process-irrevesibility

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2102	
Course Title: Thermodynamics	
CO-1	Students realize the practical importance of ideal gas theory and the use of real gases in combustion engines such as IC Engines and Gas turbines
CO-2	Students are able to calculate the properties of the gases such as internal energy, enthalpy and entropy.
CO-3	Students are able to estimate the losses which occur during operation of the heat engines, and their maximum possible operating efficiencies under STP conditions.
CO-4	Students can estimate the maximum work-output delivered by the heat engines and maximum work consumed by the reversed heat engines

SYLLABUS: MANUFACTURING PROCESS (B17 ME 2103)

UNIT– I

Manufacturing concepts: Product cycle, Job, batch and mass production, Primary and secondary manufacturing processes.

Metal Casting Process: Principle of metal casting, Pattern: Materials, Allowances and Types, Core boxes, Moulding sands: ingredients, properties, preparation, types, Moulding tools, Sand testing, Sand moulding, Machine moulding, Core making, Melting and pouring Classification of furnaces, Cupola furnace, pouring laddels; Element of gating system, casting defects.

UNIT – II

Special Casting Techniques: Permanent mould casting, Pressure die casting, Centrifugal casting, Shell mold casting, Investment casting and CO2 process.

UNIT – III

Metal Forming: Hot &Cold working, Rolling, Extrusion, metal spinning, Drawing, Piercing. Sheet Metal Forming: Concept of spring back, Materials, tools, operations, embossing, coining, stretch forming, Progressive and Compound Dies.

UNIT – IV

Forging Processes: Forgability, Forging Materials, Classification: smith, drop, press and machine forging, Forging tools, Forging Operations, High energy rate forming, Swaging.

UNIT – V

Welding Processes: Welding metallurgy, Weldability, Classification: Plastic welding (Forge, Resistance &Thermit welding), Fusion welding (Gas, Arc & Thermit welding), Solid state welding (Friction, Ultrasonic, Diffusion and Explosive welding), Soldering and Brazing, Weld defects, Weld inspection and testing. Metallurgy process and its applications

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2104	
Course Title: Metallurgy & Materials Science	
CO-1	Understand crystalline solids and their atomic structures.
CO-2	Suggest and recommend necessary engineering materials for specific applications keeping in view of the cost, design, reliability, life, working conditions and properties of the products.
CO-3	Understand different phase transformations in Iron-Iron Carbide diagram and distinguish between steels and cast irons.
CO-4	Select different materials for tools and components based on functional requirements.
CO-5	Use composite materials for different engineering applications like aerospace, automobile, ship building industry, sports item etc.
CO-6	Inclination towards self-learning, higher education and research work in the field of engineering materials

SYLLABUS: METALLURGY & MATERIALS SCIENCE (B17 ME 2104)

UNIT-I

Structure of crystalline solids: Atomic structure & bonding in solids- Unit cell, Space lattice, Crystal structures and its types-calculations of radius, Coordination Number and Atomic Packing Factor for different cubic structures - Imperfection in solids, point defects, Line defects, Planar defects and Volume defects- Concept of Slip & twinning, Indices for planes and directions.

UNIT-II

Phase diagrams: Basic terms-Solid solutions - Gibbs phase rule- Lever rule – cooling curves Phase diagrams - construction of phase diagrams- binary phase diagrams - Al-Cu and AlSi phase diagrams- Invariant reactions, eutectic, peritectic, eutectoid, peritectoid, metatectic & monotectic reactions, Iron carbon phase diagram -Heat treatment of steel- Annealing, and its types, normalizing, hardening, tempering, martemering, austempering

UNIT-III

TTT diagrams, Construction of TTT diagram, TTT diagram for hypoeutectoid and alloy steels, CCT diagram-Martensitic transformation, nature of martensitic transformation Surface hardening processes like case hardening, carburizing, cyaniding, nitriding Induction hardening, Flame hardening, hardenabilty, Jominy end-quench test, Precipitation Hardening

UNIT-IV

Engineering Alloys: Effect of alloying elements of steel -Properties, composition, and uses of Plain carbon, low carbon, medium & high carbon steels. stainless steels, high speed steels, Hadfield steels, tool steels - Cast irons, gray CI, white CI, malleable CI, SC iron-The light alloys- Al & Mg & Titanium alloys- Copper & its alloys: brasses & bronzes- super alloys, Smart materials- Nano materials.

UNIT-V

Composite Materials: Classification of composite materials, dispersion strengthened, particle reinforced and fiber reinforced composite laminates properties of matrix and reinforcement materials and structural applications of different types of composite materials – Types of Fabrication of composite materials. Powder Metallurgy: Production of metal powders - Powder Metallurgy process and its applications

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2104	
Course Title: METALLURGY & MATERIALS SCIENCE	
CO-1	Understand crystalline solids and their atomic structures.
CO-2	Suggest and recommend necessary engineering materials for specific applications keeping in view of the cost, design, reliability, life, working conditions and properties of the products
CO-3	Understand different phase transformations in Iron-Iron Carbide diagram and distinguish between steels and cast irons.
CO-4	Select different materials for tools and components based on functional requirements
CO-5	Use composite materials for different engineering applications like aerospace, automobile, ship building industry, sports item etc.
CO 6	Inclination towards self-learning, higher education and research work in the field of engineering materials.

SYLLABUS: ADVANCED ENGINEERING DRAWING (B17 ME 2105)

UNIT-I

Projection of solids: projection of solids with axis inclined to both the reference planes.

UNIT-II

Projections of Section of Solids: Section Planes: Parallel and inclined section planes, Sections and True shape of section, Sections of Solids: Prism, Pyramid, Cylinder and Cone.

UNIT-III

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT-IV

Interpenetration of Right Regular Solids: Intersection of Cylinder Vs Cylinder, Prism Vs Prism, Prism Vs Cylinder, Cylinder Vs Cone.

UNIT-V

Computer Aided Drafting: Introduction on Computer Aided Drafting, Display Devices, Input devices, Output devices, Introduction on Auto CAD, Different Commands used in Auto CAD, Brief discussion on Geometric Modelling.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2105	
Course Title: Advanced Engineering Drawing	
CO-1	Apply principles of drawing to represent dimensions of an object.
CO-2	Draw projections solids with axis inclined to both planes.
CO-3	Represent sectional views of solids.
CO-4	Develop the surfaces of regular solids and draw the projections of intersection of solids.
CO-5	Gain knowledge on Computer Aided Drafting.

SYLLABUS: MECHANICAL ENGINEERING LAB (B17 ME 2106)

LIST OF EXPERIMENTS

1. Study and valve timing diagrams for four-stroke and study & PTD of two-stroke engines.

2. Determination of volumetric efficiency of the given air compressor by (i) plate orifice method and (ii) tank capacity method.

3. Calibration of the given pressure gauge.

4. Determination of flash and fire points and b) Canradsons carbon residue test.

5. Determination of calorific value of flues (solid, liquid and gaseous) by Bomb calorimeter/Gas calorimeter.

6. Determination of the kinematic and absolute viscosity of the given sample oils.

7. Determination of inertia of the given flywheel and connecting rod.

8. Determination of modulus of rigidity of the given wire with torsion pendulum.

9. Study of boilers, various mountings and accessories.

10. Assembling of the given two-stroke petrol engine. (Instead of engine, any mechanical unit can be given for this experiment.)

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2106	
Course Title: Mechanical Engineering Lab	
CO-1	Students are now aware of the use of drawing valve timing diagrams of an engine and method to evaluate the volumetric efficiency of air compressor.
CO-2	They are also aware of method of calibrating pressure gauge, the importance of flash and fire points and calorific values of fuels.
CO-3	The importance and application by calculating viscosities of oil samples are understood.
CO-4	The use of moment of inertia and modulus of rigidity is understood.
CO-5	They are also now able to identify the parts of boiler and engines etc.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (B17 EE 2107)

LIST OF EXPERIMENTS

Part-A: Electrical Engineering

1. Verification of KCL and KVL
2. Verification of Ohms law (draw the V-I characteristics for a particular resistor)
3. Swinburne‟s test on D.C shunt Machine (predetermination of efficiency when working as motor and generator)
4. Brake test on D.C shunt motor. (determination of performance characteristics)
5. Brake test on D.C series motor. (determination of performance characteristics)
6. Brake test on three phase induction motor.(determination of performance characteristics)
7. Speed control of D.C shunt by (a) Armature voltage control (b) Field flux control Method.
8. OC and SC test on single phase Transformer (predetermination of efficiency and regulation at given power factor).

Part- B: Electronics Engineering

1. PN junction Diode Characteristics (a) Forward bias (b) Reverse bias. (cut in voltage and resistance calculations)
2. Half wave rectifier with and without filters.
3. Full wave rectifier with and without filters.
4. Transistor CE characteristics (Input and Output)
5. Characteristics CE amplifier
6. . Zener diode characteristics
7. Regulation characteristics of Zener diode.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 EE 2107	
Course Title: Basic Electrical & Electronics Engineering Lab	
CO-1	Apply the concepts of Theorems for a given electrical circuit.
CO-2	Evaluate the efficiency and regulation of a single phase transformer.
CO-3	Relate physical observations and measurements involving electrical circuits‟ theoretical principles.
CO-4	Design amplifier circuit using NPN transistor

SYLLABUS: AUTO CAD (B17 ME 2107)

LIST OF EXERCISES

1. Study the Auto CAD screen, various toolbars and menus
2. Exercises on usage of Draw and modify tool bar.
3. Exercises on mirror, rotate, array and move commands
4. Exercises on dimension and hatching
5. Draw the 2D knuckle joint with full details & dimensioning
6. Draw the screw jack 2D drawing
7. Study the 3D solids (primitives) and solids tool bar options
8. Draw bolt and nut in 3D
9. Draw various parts of screw jack in assemble them as 3D component
10. Render the 3D images already generated and apply materials and light.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 ME 2107	
Course Title: Auto CAD	
CO-1	Auto CAD screen and various Tool bars and menus and Explain about Dimensioning and Hatching
CO-2	Draw the 2D – drawings like knuckle joint, screw jack, flange coupling, lathe tool post, eccentric etc.,
CO-3	Explain about 3D solids and solids tool bar options and Drawing of 3D – components like bolt & nut, screw jack
CO-4	Rendering of 3D images

ENGLISH PROFICIENCY-I (B17BS2107)
(Common to All Branches)

UNIT-I: LISTENING

Selected Motivational Speeches

Selected Moral Stories

UNIT-II: SPEAKING

Book Review

Skit Presentation

PowerPoint Presentations

Describing event/place/thing

Extempore

Group Discussion

Picture Perception and Describing Test

UNIT-III: READING

Speeded Reading

Reading Comprehension

UNIT-IV: WRITING

Paragraph Writing

Literary Appreciation – Understanding the Language of Literature

UNIT-V: PROJECT

Ad Making

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2107	
Course Title: English Proficiency-I	
CO-1	Improve speaking skills.
CO-2	Enhance their listening capabilities.
CO-3	Learn and practice the skills of composition writing.
CO-4	Enhance their reading and understanding of different texts.
CO-5	Improve their inter-personal communication skills.
CO-6	Be confident in presentation skills.

SYLLABUS: PROFESSIONAL ETHICS &HUMAN VALUES (B17BS2108)

(Common to CIVIL, EEE& MECH)

UNIT – I

Ethics and Human Values: Ethics and Values, Ethical Vision, Ethical Decisions, Human Values – Classification of Values, Universality of Values.

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional Ethics Code of Ethics, Sample Codes – IEEE, ASCE, ASME and CSI.

UNIT – III

Engineering as Social Experimentation:

Engineering as social experimentation, Engineering Professionals – life skills, Engineers as Managers, Consultants and Leaders Role of engineers in promoting ethical climate, balanced outlook on law.

UNIT – IV

Safety Social Responsibility and Rights:

Safety and Risk, moral responsibility of engineers for safety, case studies – Bhopal gas tragedy, Chernobyl disaster, Fukushima Nuclear disaster, Professional rights, Gender discrimination, Sexual harassment at work place.

UNIT – V

Global Issues:

Globalization and MNCs, Environmental Ethics, Computer Ethics, Cyber Crimes, Ethical living, concept of Harmony in life.

Course Outcomes for Second Year First Semester Course	
Course Code: B17 BS 2108	
Course Title: Professional Ethics & Human Values	
CO	By the end of the course student should be able to understand the importance of ethics and values in life and society.

Regulation: R17	II / IV - B.Tech. II- Semester

MECHANICAL ENGINEERING
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION &EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

Code No.	Course	Category	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Sessional Marks	Exam Marks	Total Marks
B17 ME2201	Advanced Strength of Materials	ES	3	3	1	--	30	70	100
B17 ME2202	Thermal Engineering	ES	3	3	1	--	30	70	100
B17 ME2203	Metal Cutting& Machine Tools	ES	3	3	1	--	30	70	100
B17ME2204	Fluid Mechanics	ES	3	3	1	--	30	70	100
B17ME2205	Mechanical Engineering Drawing	ES	3	--	--	4	30	70	100
B17 BS2203	Engineering Economics	BS	3	3	1	--	30	70	100
B17ME2208	Manufacturing Process Lab	ES	2	--	--	3	50	50	100
B17CE2210	Strength of Materials Lab	ES	2	--	--	3	50	50	100
B17ME2209	Industry Oriented Technology Lab	ES	1	--	--	2	50	--	50
B17BS2206	English Proficiency-II	BS	--	1	1	--	--	--	--
Total			**23**	**16**	**6**	**12**	**330**	**520**	**850**

SYLLABUS: ADVANCED STRENGTH OF MATERIALS (B17 ME 2201)

UNIT –I

Deflections of Beams: Relation between curvature, slope and deflection; Slope and deflection of cantilever, simply supported and overhanging beams – Macaulay"s method and Moment area method.

UNIT –II

Fixed Beams: Relations between fixing moments of a fixed beam of uniform cross section, BMD & SFD of fixed beams of uniform and variable cross sections, Effect of sinking of support.

UNIT –III

Continuous beams: Clapeyron"s theorem of three moments for a continuous beam of varying and uniform cross sections, BMD & SFD of continuous beams of uniform cross section, Effect of sinking of support.

UNIT –IV

Columns and Struts: Buckling of columns, Euler"s theory – Columns with both ends hinged, both ends fixed, one end fixed and other end hinged, one end free and other end fixed, Limitation of Euler's formula, Empirical formulae – Rankine"s formula, Column carrying eccentric load.

UNIT-V

Bending of Curved Bars: Winkler-Bach theory of curved bars subjected to uniform bending moment – rectangular, circular, and trapezoidal cross sections, Stresses in a crane hook.

Course Outcomes for Final Year First Semester Course	
Course Code: B17 ME 2201	
Course Title: Advanced Strength of Materials	
CO-1	Find the slope deflection produced in cantilever, simply supported and overhanging beams subjected to different kinds of lateral loads.
CO-2	Draw the bending moment and shear force diagrams of fixed beams of uniform and non-uniform cross sections subjected to different load conditions, and having sinking of support.
CO-3	Draw the bending moment and shear force diagrams of continuous beams subjected to different load conditions, and having sinking of support.
CO-4	Evaluate the stresses across the cross-sections of the curved beam and crane hook subjected to external loads.
CO-5	Apply different theories to analyze the crippling stresses induced in columns and struts subjected to different load conditions.

SYLLABUS: THERMAL ENGINEERING (B17 ME 2202)

UNIT-I

Properties of Pure Substance:

Definition of pure substance, phase change of a pure substance, p-T (Pressure-Temperature) diagram for a pure substance, p-V-T(Pressure-Volume-Temperature) surface, phase change terminology and definitions, property Diagrams in common use, Formation of steam, Important terms relating to steam formation, Thermodynamic properties of steam and steam tables, External work done during evaporation, Internal latent heat, Internal energy of steam, Entropy of water, Entropy of evaporation, Entropy of wet steam, Entropy of superheated steam, Enthalpy-Entropy (h-s) charts for Mollier diagram, Determination of dryness fraction Tank or bucket calorimeter, throttling calorimeter, separating and throttling calorimeter.

UNIT-II

Vapor Power Cycles

Vapor power cycle- Rankine cycle- Reheat cycle- Regenerative cycle- Thermodynamic variables effecting efficiency and output of Rankine and Regenerative cycles- Improvements of efficiency, Binary vapor power cycle.

UNIT-III

Steam Nozzles:

Type of nozzles- Flow through nozzles- Condition for maximum discharge- Nozzle efficiency- Super saturated flow in nozzles- Relationship between area velocity and pressure in nozzle flow- Steam injectors.

UNIT-IV

Steam Turbines:

Classification of steam turbines- Impulse turbine and reaction turbine- Compounding in turbines- Velocity diagrams in impulse and reaction turbines- Degree of reaction- Condition for maximum efficiency of reaction turbines- Effect of friction on turbines constructional features governing of turbines.

UNIT-V

Condensers:

Classification of condenser- Jet, Evaporative and surface condensers- Vacuum and its measurement- Vacuum efficiency- Sources of air leakage in condensers- Condenser efficiency- Daltons law of partial pressures- Determination of mass of cooling water- Air pumps.

Steam Boilers –

Working principle of various boilers their accessories and mountings (Simple vertical, Cochran, Babcock & Wilcox and Lancashire Boiler), Performance of boilers (simple problems)

Course Outcomes for Final Year First Semester Course	
Course Code:B17 ME 2202	
Course Title: Thermal Engineering	
CO-1	The student gets complete knowledge of steam and its properties.
CO-2	The student learns the complete calculation procedures for designing steam turbines, steam condensers, nozzles etc. used in thermal power plants, steam engines, water turbines and many other industrial applications.
CO-3	The student is prepared to work in industry immediately after his course

SYLLABUS: METALCUTTING& MACHINE TOOLS (B17 ME 2203)

UNIT-I Mechanics of Metal Cutting: Orthogonal and oblique cutting, mechanics of chip formation, types of chips; classification, nomenclature, signature (ASA & ISO systems) of single point cutting tools, tool materials; tool wear and tool life; Cutting forces-Merchant"s circle, Machinability, Cutting fluids.

UNIT-II

Machine tools using Single point cutting tools: Engine lathe; Capstan and turret lathe, shaper, planner, Slotter and boring-Types, Parts, Specifications, Mechanisms, Operations and machining parameters.

UNIT-III

Machine tools using Multi point cutting tools: Drilling machine-Types, Parts, Specifications, Mechanisms, Types of drills, Nomenclatures of twist drill, Operations and machining parameters Milling machine-Types, Parts, Specifications, Mechanisms, Attachments, Types of Milling cutters, Nomenclature of plain milling cutter, Operations, machining parameters and Indexing methods. Broaching machine-Types, Parts, Specifications, Types of Broaches, Nomenclature of pull broach, Operations and machining parameters

UNIT-IV

Machine tools using Abrasive wheels: Grinding Machine- Types, Parts, Specifications, Manufacturing of grinding wheel-bonding processes, grit, grade and structure, selection of grinding wheels, mounting of grinding wheels, glazing, loading, dressing and truing of grinding wheel, Operations and machining parameters Micro finishing Operations-Lapping, honing, super finishing, polishing and buffing

UNIT-V

Unconventional Methods of Machining: Process, Characteristics, Advantages, Limitations, Applications of Abrasive Jet Machining (AJM), Ultrasonic Machining (USM), Water Jet Machining (WJM), Electro Discharge Machining (EDM), Wire-cut EDM, Electron Beam Machining (EBM), Plasma Arc Machining (PAM), Laser Beam Machining (LBM), Chemical milling; Photochemical milling, Electro Chemical Machining (ECM), Electro Chemical Grinding (ECG)

Course Outcomes for Final Year First Semester Course	
Course Code: B17 ME 2203	
Course Title: Metal Cutting & Machine Tools	
CO-1	Students will be able to describe the mechanisms of metal cutting.
CO-2	Students will be able to calculate cutting forces, tool life and machining parameters.
CO-3	Students will be able to design the single point and multi point cutting tools.
CO-4	Students will be able to demonstrate the working of various machine tools like lathe, milling machine and grinding machine etc.
CO-5	Students will be able to identify different micro finishing operations.
CO-6	Students will be able to assess the advantages, limitations and applications of unconventional methods of machining.

SYLLABUS: FLUID MECHANICS (B17 ME 2204)

UNIT-I

Properties of fluids- Introduction-Viscosity- Pressure and its measurement, Absolute, Gauge, Atmospheric and Vacuum pressure – Manometers, Simple manometers, Differential manometers. Hydrostatic forces on surfaces- Total Pressure and Pressure Centre- Vertical, Horizontal, inclined and Curved plane surfaces submerged in liquid- Buoyancy and Flotation.

UNIT-II

Fluid Kinematics & Fluid Dynamics: Types of fluid flow- Continuity equation- Velocity potential function and Stream Function- Types of Motion, Linear Translation, Linear deformation, Angular deformation, Rotation, Vorticity and circulation-Vortex flow, forced and Free Vortex – Equation of Motion- Euler's equation - Bernoulli's equation and its applications- Venturimeter, Orifice Meter, Pitot tube-Momentum Equation-Momentum of momentum Equation.

UNIT-III

Viscous Flow: Favourable pressure gradient and adverse pressure gradient-Power absorbed in Viscous Flow-Flow through pipes & Plates- Hagen Poiseulle flow- Darcy's Weisbach friction factor- Loss of head due to friction in pipes, Minor Losses and Major losses - Flow through branched pipes- Power transmission through pipes. **Dimensional and Modeling Analysis**: Fundamental and derived dimensions- Dimensionless groups-Rayleigh method Buckingham π-theorem- Model Analysis - Types of similarity- Geometric, Kinematic and Dynamic similarities- Dimensionless numbers- Model Laws.

UNIT-IV

Laminar Boundary Layer: Definition- Laminar Boundary Layer- Turbulent Boundary Layer -Laminar Sub layer- Boundary Layer thickness-Displacement thickness, Momentum thickness and Energy thickness-Momentum integral equation- Flow over a flat plate. Turbulent Boundary Layer: Laminar- Turbulent transition- Momentum equations and Renold's stresses- Fully developed turbulent flow through a pipe-Turbulent boundary layer on a flat plate- Laminar sub-layer- Boundary layer separation and control.

UNIT-V

Compressible Fluid Flow: Thermodynamic relations- Continuity, Momentum and Energy equations-Velocity of sound in a compressible fluid- Mach number and its significance Limits of incompressibility-Pressure field due to a moving source of disturbance Propagation of pressure waves in a compressible fluids-Stagnation properties- Stagnation pressure, Temperature and density- Area velocity relationship for compressible flow

Course Outcomes for Final Year First Semester Course	
Course Code: B17 ME 2204	
Course Title: Fluid Mechanics	
CO-1	Apply the Bernoulli equation to solve problems in fluid mechanics.
CO-2	Apply the concepts of momentum equation for finding the forces acting on the vanes of the turbines.
CO-3	Apply control volume analysis to problems in fluid mechanics.
CO-4	Apply potential flow theory to solve problems in fluid mechanics.
CO-5	Identify the recent developments in fluid mechanics, with application to aerospace systems.

SYLLABUS: MECHANICAL ENGINEERING DRAWING (B17 ME 2205)

Screw threads, Screw Fastenings, keys, and Riveted joints using standard Empirical formulae. Cotter-joints, Shaft couplings: Box and split muff couplings, Flanged, Flexible, Universal and Oldham couplings, Assembly drawing of various engine components and machine tool components (Simple eccentric, swivel bearing, plumber block, Screw Jack, Stuffing Box).

Conventional representations, Limits, Fits and Tolerances, Geometrical Tolerances, Indication of surface roughness, Production Drawings.

Course Outcomes for Final Year First Semester Course	
Course Code:B17 ME 2205	
Course Title: Mechanical Engineering Drawing	
CO-1	Know drawing of Screw threads and Screw Fastenings using standard Empirical formulae.
CO-2	Draw Riveted joints, Keys, Cotter-joint, Draw Couplings (Shaft couplings: Box and split muff couplings, Flanged, Flexible, Universal and Oldham couplings).
CO-3	Draw the dimensional and geometrical tolerances and surface roughness symbols.
CO-4	Draw Assembly and production drawings of various engine components and machine tool components.

ENGINEERING ECONOMICS (B17 BS 2203)

UNIT-I

Introduction to Economics: Wealth, Welfare and Scarce Definitions of Economics; Micro & Macro Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of demand – Meaning, types, Significance of Elasticity of Demand, Measurement of price Elasticity of Demand. Need for Demand forecasting, forecasting techniques.

UNIT-II

Cost Analysis: Classification of cost, Elements of cost, Methods of costing (Job costing, Process costing & Unit costing). Break-Even Analysis (BEA): Determination of Break-Even Point, Assumptions and Applications.

UNIT-III

Market Structures: Features and price determination under Perfect competition, Monopoly, Monopolistic competition and Oligopoly. Pricing practices: Price - meaning, methods of pricing

UNIT-IV

Economic Systems: Features and Evaluation of Capitalism, Socialism and Mixed Economy. Business cycles: Meaning, Phases, Causes & theories of Business Cycle.

UNIT-V

Depreciation and Financial Accounting: Depreciation-causes and methods (straight line method, diminishing balance method). Final Accounts: Preparation of Trading Account, Profit & Loss Account and Balance sheet.

Course Outcomes for Final Year First Semester Course	
Course Code: B17 BS 2203	
Course Title: Engineering Economics	
CO-1	Provide detailed insight about origin & definitions of economics & enlighten the students about demand analysis.
CO-2	Illustration about applications of cost Concepts & analysis of breakeven point.
CO-3	Understand about various types of Market Structure and Pricing practices implemented by the organization.
CO-4	Infuse knowledge about different Economic systems & Business cycles.
CO-5	Enlighten the students regarding the aspects of Depreciation & Financial Accounting

SYLLABUS: MANUFACTURING PROCESS LAB(B17 ME 2208)

LISTOFEXPERIMENTS

1. Use of basic tools and operations of the following trades

S. No.	Trade/Machine	No .of exercises
1	Moulding	3
2	Welding	3
3	Lathe Machine	3
4	Milling Machine	1
5	Shaping Machine	1

2. Moulding sand testing (Not for examination only for demonstration purpose
3. Forging(Not for examination only for demonstration purpose)

Course Outcomes for Final Year First Semester Course	
Course Code: B17 ME 2208	
Course Title: Manufacturing Process Lab	
CO-1	Student will be able to prepare moulds for a given component.
CO-2	Student will be able to apply the knowledge of arc welding to join two metal pieces.
CO-3	Student will be able to practice plain turning, facing, step turning, taper turning, and thread cutting operations on the lathe machine.
CO-4	Student will be able to generate horizontal, vertical and angular surfaces on a given work piece using shaper.
CO-5	Student will be able to generate spur gear on milling machine.
CO-6	Student will be able to demonstrate Capstan and Turret lathe, cylindrical grinder and surface grinding machine.

SYLLABUS: STRENGTH OF MATERIALS LAB (B17 CE 2210)

LIST OF EXPERIMENTS

1. To study the stress strain characteristics (tension and compression) of metals by using UTM.
2. To study the stress strain characteristics of metals by using Hounsefield Tensometer.
3. Determination of compression strength of wood.
4. Determination of hardness using different hardness testing machines-Brinnels, Vickers and Rockwell‟s.
5. Impact test by using Izod and Charpy methods.
6. Deflection test on beams using UTM.
7. Tension shear test on M.S. Rods.
8. To find stiffness and modulus of rigidity by conducting compression tests on springs.
9. Torsion tests on circular shafts.
10. Bulking of sand.
11. Punch shear test, hardness test and compression test by using Hounse field tensometer.
12. Sieve Analysis and determination of fineness numbe

Course Outcomes for Final Year First Semester Course	
Course Code: B17 CE 2210	
Course Title: Strength of Materials Lab	
CO-1	To understand the different types of loading and measure the loads.
CO-2	To understand the material properties of different materials and the ways of finding them.
CO-3	To understand the bulking property and fineness of sand grains and the methods of finding them.

INDUSTRY ORIENTED TECHNOLOGY LAB (B17 ME 2209)

CATIA

LIST OF EXERCISES

1. Study the CATIA CAD screen, various toolbars and menus
2. Exercises on usage of Draw and modify tool bar.
3. Exercises on mirror, rotate, array and move commands
4. Exercises on dimension and hatching
5. Draw the 2D knuckle joint with full details & dimensioning
6. Draw the screw jack 2D drawing
7. Study the 3D solids (primitives) and solids tool bar options
8. Draw bolt and nut in 3D
9. Draw various parts of screw jack in assemble them as 3D component
10. Render the 3D images already generated and apply materials and light.

Course Outcomes for Final Year First Semester Course	
Course Code: B17 ME 2209	
Course Title: Industry Oriented Technology Lab	
CO-1	CATIA screen and various Tool bars and menus and Explain about Dimensioning and Hatching
CO-2	Draw the 2D – drawings like knuckle joint, screw jack, flange coupling, lathe tool post, eccentric etc.,
CO-3	Explain about 3D solids and solids tool bar options and Drawing of 3D – components like bolt & nut, screw jack.
CO-4	Rendering of 3D images.

SYLLABUS: ENGLISH PROFICIENCY-II (B17BS2206)
(Common to All Branches)

UNIT-1: SPEAKING

Analyzing proverbs

Enactment of One-act play

UNIT-2: READING

Reading Comprehension

Summarizing Newspaper Article

UNIT-3: WRITING

Note Taking &Note Making

Precis Writing

Essay Writing

Letter Writing

Picture Description

Literary Appreciation– Learning the Language of Literature

UNIT-4: VOCABULARY

Indian-origin English Words

Phrasal Verbs for Day-to-Day Communication

Commonly used Idiomatic Expressions

UNIT-5: PROJECT

Research Writing

Course Outcomes for Final Year First Semester Course	
Course Code: B17 BS 2206	
Course Title: English Proficiency-II	
CO-1	Develop the skills of taking and making notes
CO-2	Interpret the pictures appropriately and effectively.
CO-3	Read, comprehend and infer a given piece of writing effectively.
CO-4	Learn and practice the skills of Research writing.
CO-5	Communicate well through various forms of writing.
CO-6	Be confident in giving presentations and dealing with people.

Regulation: R17					III / IV - B.Tech. I- Semester				
MECHANICAL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of the Subject**	**Category**	**Credits**	**Lecture Hrs**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
B17ME3101	Operations Research	ES	3	3	1	--	30	70	100
B17ME3102	IC Engines &Gas Turbines	ES	3	3	1	--	30	70	100
B17ME3103	Kinematics of Machines	ES	3	3	1	--	30	70	100
B17ME3104	Design of Machine Elements	ES	3	3	1	--	30	70	100
B17ME3105	Fluid Machines &Systems	ES	3	3	1	--	30	70	100
B17ME3106	Industrial Measurements &Metrology	ES	3	3	1	--	30	70	100
B17ME3107	IC Engines &Kinematics of Machines Lab	ES	2	--	--	3	50	50	100
B17ME3108	Metrology Lab	ES	2	--	--	3	50	50	100
B17 BS3101	Problem Solving &Linguistic Competence	BS	1	--	3	--	30	70	100
B17ME3109	Modeling Lab	ES	1	--	--	3	50	50	100
B17BS 3105	IPR & Patents	BS	--	--	2	--	--	---	--
Total			**24**	**18**	**11**	**9**	**360**	**640**	**1000**

SYLLABUS: OPERATIONS RESEARCH (B17ME3101)

UNIT-I

Introduction to OR: Definition of OR, Characteristics and phases of OR, Scope of OR, OR Models, General Methods for Solving OR Models, Role of Computers in OR. Linear Programming: Formulation, Graphical Solution, Simplex Method, Artificial Variable Technique – Big M method, Duality.

UNIT-II

Transportation Model: Mathematical Formulation, Tabular Representation, Balanced and unbalanced transportation Problems - Initial Solution by VAM and Optimality test by MODI Method, Degeneracy in TP. Assignment Model: Mathematical Formulation, Hungarian Algorithm, Balanced and unbalanced Assignment Problems, Travelling Salesman Problem.

UNIT-III

Job Sequencing: Introduction, Assumptions, Johnson‟s Algorithm for Sequencing n - jobs through 2 machines, Problem with n- jobs and 3 machines, Problems with n - jobs and m - machines, Graphical Solution for 2 - Jobs and m - machines problem. Inventory Models: Definition of inventory, costs associated with inventory problems, classification of inventory models, Deterministic inventory models - EOQ model without and with shortages, Production inventory model without and with shortages, Inventory models with price - breaks.

UNIT-IV

Games Theory: Introduction, Basic definitions, Two - Person zero - sum games - Minimax (maximin) criterion, saddle point, value of a game, Solution of games with Saddle point, Mixed strategy games - Arithmetic method for (2 x 2) games, Dominance principle to reduce size of game, solution of (2 x n) and (m x 2) games, Algebraic Solution to rectangular games. Queuing Models: Structure of queuing models, characteristics of Queuing process, Kendall‟s notation, Single channel systems - (M/M/1:∞/FIFO) model and (M/M/1:N/FIFO) model.

UNIT-V

Network Analysis: Introduction, Project Scheduling by CPM and PERT, Network diagram representation, rules for drawing network diagram, Labeling by Fulkerson‟s rule, Network calculations - EST, EFT, LST, LFT, Float/Slack and critical path, PERT calculations.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3101	
Course Title: Operations Research	
CO-1	Formulate a real time situation into a mathematical model.
CO-2	Identify and develop operational research models from verbal description of real system.
CO-3	Formulate simple reasoning, learning and optimization problems, in terms of the representations and methods presented.
CO-4	Demonstrate the hand execution of basic reasoning and optimization algorithms on simple problems.
CO-5	Formulate more complex, but still relatively simple problems, and apply implementations of selected algorithms to solve these problems.
CO-6	Apply and analyze mathematical optimization functions to various applications.

SYLLABUS: IC ENGINES &GAS TURBINES (B17ME3102)

UNIT-I

I.C. engines: classification-comparison of two stroke and four stroke engines- comparison of S.I. and C.I. engines-Valve timing and port timing diagrams- Efficiencies- air standard efficiency, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, volumetric efficiency and relative efficiency-Testing and performances of I.C. engines -Basic principles of carburetion and fuel injection.

UNIT-II

Combustion in S.I. Engines- Normal combustion and abnormal combustion Importance of flame speed and effect of engine variables-types of abnormal combustion pre-ignition and knock, Fuel requirements and fuel rating, anti-knock additions- Combustion chamber requirements and Types of combustion chamber- Design principles of combustion chambers.

UNIT-III

Combustion in C.I. Engines- Stages of combustion- Delay period and its importance- effect of engine variables, diesel knock, suction compression and combustion induced turbulence, open and divided combustion chambers.

UNIT-IV

Reciprocating and Rotary Compressors: Reciprocating compressors-effect of clearance in compressors, volumetric efficiency-single stage and multi stage compressors-effect of inter cooling in multi stage compressors-Vane type blower-centrifugal compressor- Adiabatic efficiency- Diffuser- Axial flow compressors- Velocity diagrams, degree of reaction, performance characteristics.

UNIT-V

Gas Turbines: Simple gas turbine plant- Ideal cycle, closed cycle and open cycle for gas turbines Efficiency, work ratio and optimum pressure ratio for simple gas turbine cycle Parameters of performance- Actual cycle, regeneration, Inter-cooling and reheating, closed and semi-closed cycle Jet propulsion and Rockets.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3102	
Course Title: IC Engines & Gas Turbines	
CO-1	Apply the knowledge of gas power cycles adequately and can calculate their efficiencies.
CO-2	Explain the processes involved in combustion in S.I Engines.
CO-3	Explain the processes involved in combustion in C.I Engines.
CO-4	Apply the knowledge of reciprocating and rotary compressors in engineering applications.
CO-5	Compute and develop various methods to improve the efficiency of gas turbine power plants, and can explain jet propulsions.

SYLLABUS: KINEMATICS OF MACHINES (B17ME3103)

UNIT-I

Mechanisms: Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematics pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully and incompletely constrained . **Mechanism and Machines** – Mobility of Mechanisms : Grubler"s criterion, classification of machines – kinematics chain – inversions of mechanism – inversions of four bar chain, single and double slider crank chains, Mechanical Advantage

UNIT-II

Kinematics: Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration – Graphical method – Application of relative velocity method. **Plane motion of body**: Instantaneous center of rotation– Three centers in line theorem – Graphical determination of instantaneous center, determination of angular velocity of links by instantaneous center method.

Analysis of Mechanisms: Analysis of slider crank chain for displacement- velocity and acceleration of slider – Acceleration diagram for a given mechanism. Kliens construction - Coriolis acceleration - determination of Coriolis component of acceleration

UNIT-III

Straight-line motion mechanisms: Exact and approximate copied and generated types – Peaucellier - Hart - Scott Russel- Modified Scott Russel – Grasshopper – Watt -Tchebicheff"s - Pantographs Steering gears: Conditions for correct steering – Davis Steering gear, Ackerman"s steering gear. Hooke's Joint: Single and double Hooke"s joint –velocity ratio – application – problems

UNIT-IV

Cams: Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity, Simple harmonic motion and uniform acceleration and retardation. Construction of cam profiles- Cam with knife edged follower and roller follower Maximum velocity and maximum acceleration during outward and return strokes.

UNIT-V

Higher pair: Friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion – involutes profiles – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference – expressions for arc of contact and path of contact of Pinion & Gear **Gear Trains**: Introduction – Types – Simple – compound and reverted gear trains – Epicyclic gear train. Methods of finding train value or velocity ratio of Epicyclic gear trains. Torques in epicyclic gear trains

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3103	
Course Title: Kinematics of Machines	
CO-1	Understand the basic principles of mechanisms in mechanical engineering applications.
CO-2	Understand the mechanisms, their inversions straight line motion mechanisms steering mechanisms etc.
CO-3	Understand the importance of toothed gears, gear trains.
CO-4	Understand the cam their practice application.
CO-5	Understand the importance of relative motion, velocity, and accelerations of the various elements in a mechanism

SYLLABUS: DESIGN OF MACHINE ELEMENTS(B17ME3104)

UNIT-I

Introduction: Machine Design, basic procedure of machine design, traditional design methods, general design models, BIS system of designation of steels, manufacturing considerations in design. **Design against static loads**: Modes of failure, Factory of safety, stress strain relationship, shear stress and shear strain, stresses due to bending moment, stresses due to torsional moment, eccentric axial loading, Design of cotter and knuckle joints, Static failure theories.

UNIT-II

Design Against Fluctuating Load: stress concentration, stress concentration factors, reduction of stress concentration, fluctuating stresses, fatigue failure, endurance limit, notch sensitivity, Soderberg, Goodman and modified Goodman diagrams, Gerber equation, fatigue design under combined stresses.

UNIT-III

Threaded joints: forms of threads, basic types of screw fastenings, ISO metric screw threads, eccentrically loaded bolted joints. 9 Welded joints: different types welded joints and their design aspects, Types and strength of weld joints subjected to bending loads and eccentric loads.

UNIT-IV

Shafts: Shafts design on strength basis, torsional rigidity basis, Design of hollow shafts, flexible shafts, ASME codes for shafts, Keys: keys design, Flat & square keys; Couplings: Rigid and flange couplings, Flexible couplings.

UNIT-V

Spring Design: classification and spring materials, Design of helical compression springs and helical springs subjected to fatigue loading, Design of laminated springs, Equalized stress in spring leaves, Surge in springs, Nipping and shot peening.

Course Outcomes for Third Year First Semester Course	
Course Code:B17 ME 3104	
Course Title: Design of Machine Elements	
CO-1	Explain the design concepts of static strength of mechanical components
CO-2	Explain the design concepts of fatigue strength of mechanical components
CO-3	Determine the strength of the threaded and welded joints
CO-4	Design the shafts, rigid and flexible couplings parametrically for different loading conditions.
CO-5	Design the energy absorbing mechanical components such as springs for the specified loading conditions.

SYLLABUS: FLUID MACHINES & SYSTEMS (B17ME3105)

UNIT-I

Impact of jet and jet propulsion: Impact of jet on stationary surfaces- Impact of jet on hinged surfaces- moving curved vane with tangential entry of water- Radial flow over the vanes- Jet propulsion of tank and ships

UNIT-II

Hydraulic Turbines: Classification- Pelton wheel- Reaction turbines- Inward and outward radial flow reaction turbines- Francis turbine- Axial flow reaction turbine- Kaplan turbine- Draft tube Types- Theory- and efficiency of draft tube. Specific Speed: Determination- Significance- Unit quantities- Unit speed- Unit discharge and unit power- Characteristic curves of hydraulic turbines- Constant head curves- Constant speed curves and Iso-efficiency curves- Governing of turbines.

UNIT-III

Centrifugal Pumps: Main parts- Efficiency- Minimum speed for starting- Multi-stage centrifugal pumps- Specific speed of a centrifugal pump- Priming of a centrifugal pump Characteristic curves- Main, Operational and constant efficiency curves- Cavitation- Effects Cavitation in Hydraulic machines.

UNIT-IV

Reciprocating Pumps: Main parts- Classification- Velocity and acceleration variation in suction and delivery pipes due to piston acceleration- Effect of variation of velocity on friction in suction and delivery pipes- Effect of acceleration in suction and delivery pipes on indicator diagram Effect of friction- Maximum speed of reciprocating pump- Air vessels, Simple problems on air vessels

UNIT-V

Hydraulic Press- Hydraulic accumulator- Differential hydraulic accumulator- Hydraulic intensifier- Hydraulic ram- Hydraulic lift- Hydraulic crane- Fluid coupling- Hydraulic torque converter, Air lift pump.

Course Outcomes for Third Year First Semester Course	
Course Code:B17 ME 3105	
Course Title: Fluid Machines & Systems	
CO-1	Understand the concepts of jets and jet propulsion and its applications in fluid machinery.
CO-2	Gain the knowledge such as work done, specific speed, performance curves and governing of impulse and reaction turbines.
CO-3	Understand the centrifugal pumps - Multi stage pumps, Minimum speed required to start the pump, Performance curves.
CO-4	Understand the various aspects of Reciprocating pumps such as working, indicator diagram, air vessels.
CO-5	Understand description and working of various types of hydraulic devices.

SYLLABUS: INDUSTRIAL MEASUREMENTS & METROLOGY (B17ME3106)

UNIT-I

Instrumentation: Concepts of measurements, static performance characteristics, accuracy of measurement and its analysis. Instrumentation for measurement: Force (analytical balance, proving rings), torque(dynamometers), strain(opto-mechanical method),Pressure(Mc-leodguage), flow(venturimeter, orifice meter, nozzel), Temperature (bimetallic thermostat, liqid- in-glass, optical)and vibration(optical).

UNIT-II

Optical Methods of Measurement: Introduction, Laserbeam as a light pointer, length/displacement measurement, temperature sensors, seismographic measurement. Introduction to fiber optics, fiber types, properties of optical fibres and a fibre optic sensor configuration..

UNIT-III

Limits, Fits and gauges: limits, fits and Interchangeability, Plain limit gauges, Measurement of screw threads: major diameters, Minor diameters and effective diameter, Pitch. Limit gauges for internal and external threads. Measurement of spur gears: pitch, profile, lead, backlash, tooth thickness.

UNIT-IV

Measuring devices: Tool maker's microscope, Slip gauges, comparator: Twisted strip type, Optical lever, Electric, Pneumatic, Optical projector. Optical bevel protractor, Sine bar, Angle gauges, Precision level, Autocollimator, Angle dekkor, Optical dividing heads and rotary tables, Straightness measurement, Squareness testing, Flatness measurement, Roundness measurement.

UNIT-V

Surface texture and Acceptance tests: Surface texture Parameters, sampling length, Specification, Stylus instruments for surface roughness measurement. Acceptance tests on machine tools: Lathe, Milling machine and Radial drilling machine.

Course Outcomes for Third Year First Semester Course	
Course Code: B17ME3106	
Course Title: Industrial Measurements & Metrology	
CO-1	identify the uncertainties in dimensional metrology and the define the measurement standards;
CO-2	describe the fundamentals of dimensional and geometrical tolerances;
CO-3	measure length and angles using line-graduated instruments, i.e. Vernier calipers, micrometers, bevel protractor, sine bar and surface plates;
CO-4	use comparative length-measuring instruments, i.e. dial indicator, to measure variations in the distance between two or more surfaces;
CO-5	use effective methods of measuring straightness, flatness, roundness, profile, screw threads and gear teeth;
CO-6	measure dimensions of shafts, bearings and linear surfaces in metric and imperial units using calibers, micrometers, and scales;
CO-7	use contour projector and coordinate measuring machine to record measurements of complex profiles with high sensitivity;
CO-8	Use gage blocks, fixed gages, pneumatic gages gage blocks to measure various work pieces.
CO-9	Explain the effect of environmental conditions on the accuracy of measurements;
CO-10	demonstrate the correct methods for adjustment and calibration of various measuring instruments;
CO-11	Use appropriate method for determination of accuracy based on product function and manufacturing capability.

ICENGINES& KINEMATICS OFMACHINES LAB (B17ME3107)

LIST OF EXPERIMENTS

- **IC Engines Lab**

1. Load test on single cylinder diesel Engine.
2. Morse test on multi-cylinder petrol engine.
3. Heat balance sheet on I.C. Engines.
4. Study of multi-cylinder engines and determination of its firing order
5. Performance test on multi cylinder diesel engine
6. To rectify basic essential issues of modern cars such as Jump starting, Tyre replacement &repair, dismantling some components to understand their mechanisms etc.

- **Kinematics of Machines Lab**

1. Study of automobile mechanisms
2. Verification of laws of balancing.
3. Determination of ratios of angular speeds of shafts connected by Hooke's joint.
4. Determination of the ratio of times and ram velocities of Whitworth quick return motion mechanism.
5. To draw curves of slider displacement and crank angle and linear velocities w.r.t. time for a slider crank mechanism and compare with theoretical values.
6. To determine the relation of gyroscopic couple and compare with the theoretical values..

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3107	
Course Title: IC Engines &Kinematics of Machines Lab	
CO-1	A This course comprehensively deals with practical approach to I.C Engines and four bar chain mechanisms
CO-2	To expose students to different methods of finding friction power in single and multi cylinder engines
CO-3	Understand the working of Gyroscopes
CO-4	Deal with basic trouble shooting aspects and specifications of Car model: Maruthi ZEN

SYLLABUS: METROLOGY LAB (B17ME3108)

LIST OF EXPERIMENTS

1. Calibration of vernier calipers.
2. Calibration of outside micrometer.
3. Calibration of tool room microscope.
4. Calibration of mechanical comparator.
5. Measurement of taper using dial gauge and sine bar.
6. Study and use of bevel protractor.
7. Measurement of the height of circular spigot.
8. Measurement of angle of v-groove.
9. Measurement of distance between two holes of a template using vernier height gauge.
10. Measurement of gear parameters.
11. Establishing thread details on profile projector.
12. Measurement of tool angles on profile projector.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3108	
Course Title: Metrology Lab	
CO-1	Students will understand construction and working of various measuring instruments and its calibration.
CO-2	The student will be able to operate measurement instruments on their own and test different components for their dimensional accuracy.
CO-3	Students will be able to understand application of gauges.

PROBLEM SOLVING & LINGUISTIC COMPETENCE (B17BS3101)

(Common to all Branches)

Part-A: Verbal and Soft Skills-I

Grammar: (VA) Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses(use of the appropriate clause , conditional and relative clauses), phrases(use of the phrases, phrasal verbs) to-infinitives, gerunds, question tags, voice, direct & indirect speech, degrees of comparison, modifiers, determiners, identifying errors in a given sentence, correcting errors in sentences.

Vocabulary: (VA)

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants (with emphasis on high frequency words), contextual meanings with regard to inflections of a word, frequently confused words, words often mis-used, multiple meanings of the same word (differentiating between meanings with the help of the given context), foreign phrases, homonyms, idioms, pictorial representation of words, word roots, collocations.

Reasoning :(VA)

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Analogies (building relationships between a pair of words and then identifying similar relationships), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), odd man (to use logical reasoning and eliminate the unrelated word from a group), YES-NO statements (sticking to a particular line of reasoning Syllogisms.

Usage :(VA)

Sentence completion (with emphasis on signpost words and structure of a sentence), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence.

Soft Skills:

Introduction to Soft Skills – Significance of Inter & Intra-Personal Communication – SWOT Analysis – Creativity & Problem Solving – Leadership & Team Work - Presentation Skills Attitude – Significance – Building a positive attitude – Goal Setting – Guidelines for Goal Setting – Social Consciousness and Social Entrepreneurship – Emotional Intelligence - Stress Management, CV Making and CV Review

Part-B: Quantitative Aptitude–I

Numbers, LCM and HCF, Chain Rule, Ratio and Proportion Importance of different types of numbers and uses of them: Divisibility tests, Finding remainders in various cases, Problems related to numbers, Methods to find LCM, Methods to find HCF, applications of LCM, HCF. Importance of chain rule, Problems on chain rule, Introducing the concept of ratio in three different methods, Problems related to Ratio and Proportion.

Time and work, Time and Distance Problems on man power and time related to work, Problems on alternate days, Problems on hours of working related to clock, Problems on pipes and cistern, Problems on combination of the some or all the above, Introduction of time and distance, Problems on average speed, Problems on Relative speed, Problems on trains, Problems on boats and streams, Problems on circular tracks, Problems on polygonal tracks, Problems on races.

Percentages, Profit Loss and Discount, Simple interest, Compound Interest, Partnerships, shares and dividends

Problems on percentages-Understanding of cost price, selling price, marked price, discount, percentage of profit, percentage of loss, percentage of discount, Problems on cost price, selling price, marked price, discount. Introduction of simple interest, Introduction of compound interest, Relation between simple interest and compound interest, Introduction of partnership, Sleeping partner concept and problems, Problems on shares and dividends, and stocks.

Introduction, number series, number analogy, classification, Letter series, ranking, directions Problems of how to find the next number in the series, Finding the missing number and related sums, Analogy, Sums related to number analogy, Ranking of alphabet, Sums related to Classification, Sums related to letter series, Relation between number series and letter series, Usage of directions north, south, east, west, Problems related to directions north, south, east, west.

Data sufficiency, Syllogisms Easy sums to understand data sufficiency, Frequent mistakes while doing data sufficiency, Syllogisms Problems.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3101	
Course Title: Problem Solving & Linguistic Competence	
CO-1	Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
CO-2	Answer questions on synonyms, antonyms and other vocabulary based exercises while attempting CAT, GRE, GATE and other related tests.
CO-3	Use their logical thinking ability and solve questions related to analogy, syllogisms and other reasoning based exercises.
CO-4	Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.
CO-5	Apply soft skills in the work place and build better personal and professional relationships making informed decisions.

SYLLABUS: MODELLING LAB (B17ME3109)

LIST OF EXERCISES

1. Study the Modelling screen, various toolbars and menus
2. Exercises on usage of Draw and modify tool bar.
3. Exercises on mirror, rotate, array and move commands
4. Exercises on dimension and hatching
5. Draw the 2D knuckle joint with full details & dimensioning
6. Draw the screw jack 2D drawing
7. Study the 3D solids (primitives) and solids tool bar options
8. Draw bolt and nut in 3D
9. Draw various parts of screw jack in assemble them as 3D component
10. Render the 3D images already generated and apply materials and light.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3109	
Course Title: Modeling Lab	
CO-1	Modelling screen and various Tool bars and menus and Explain about Dimensioning and Hatching
CO-2	Draw the 2D – drawings like knuckle joint, screw jack, flange coupling, lathe tool post, eccentric etc.
CO-3	Explain about 3D solids and solids tool bar options and Drawing of 3D – components like bolt & nut, screw jack.
CO-4	Rendering of 3D images.

SYLLABUS: IPR& PATENTS (B17BS3105)
(Common to CE, EEE& ME)

UNIT I

Intellectual Property Law: Basics - Types of Intellectual Property - Innovations and Inventions - Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Compliance and Liability Issues

UNIT II

Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership– Copyright Formalities and Registration – Limitations – Infringement of Copyright - Plagiarism and difference between Copyright infringement and Plagiarism

UNIT III

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT IV

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

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Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3101	
Course Title: IPR & Patents	
CO-1	Identify various types of intangible property that an engineering professional could generate in the course of his career.
CO-2	Distinguish between various types of protection granted to Intellectual Property such as Patents, Copy Rights, Trademarks etc.,
CO-3	List the steps involved in getting protection over various types of intellectual property and maintaining them.
CO-4	Take precautions in writing scientific and technical reports without plagiarism.
CO-5	Help micro, small and medium entrepreneurs in protecting their IP and respecting others IP as part of their business processes.

Regulation: R17				III / IV - B.Tech. II- Semester					
MECHANICAL ENGINEERING (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	Name of the Subject	Category	Credits	Lecture Hrs	Tutoral Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
B17ME3201	Industrial Engineering &Management	ES	3	3	1	--	30	70	100
B17ME3202	Control Systems	ES	3	3	1	--	30	70	100
B17ME3203	Dynamics of Machines	ES	3	3	1	--	30	70	100
B17ME3204	Machine Design	ES	3	3	1	--	30	70	100
#OE	Open Elective	ES	3	3	1	--	30	70	100
B17ME3207	Computer Aided Design	ES	3	3	1	--	30	70	100
B17ME3208	Industrial Engineering Lab	ES	2	--	--	3	50	50	100
B17ME3209	Fluid Mechanics and Machinery Lab	ES	2	--	--	3	50	50	100
B17 BS3201	Employability Skills	BS	1	--	3	--	30	70	100
B17 BS3202	Basic Coding	BS	1	--	--	3	50	50	100
Total			**24**	**18**	**9**	**9**	**360**	**640**	**1000**

#OE(Open Elective)	B17BS3207	Entrepreneurship
	B17CS 3213	Database Management System
	B17CE3207	Waste Water Management
	B17CS 3210	Computer Graphics
	B17ME3205	Industrial Robotics
	B17ME3206	Green Engineering Systems

SYLLABUS: INDUSTRIAL ENGINEERING& MANAGEMENT (B17ME3201)

UNIT-I

Concepts of Industrial Management: Principles of Management, Growth of management thought, Functions of management, Principles of organization, Types of organization and committees. **Personnel management and Industrial relations**: Functions of personnel management, Theories of motivation, Discipline in industry, Promotion, Transfer, Lay off and Discharge, Labor turnover, Trade unions, Industrial disputes, Strikes, Lock-out, Picketing, Gherao, Settlement of industrial disputes, Collective bargaining, Industrial dispute act 1947 and Factories act 1948.

UNIT-II

Production planning and control: Types of productions, Production cycle, Product design and development, Process planning, Forecasting, Loading, Scheduling, Dispatching, Routing, Progress control, Line of Balance. Simple problems.

UNIT-III

Plant location & Plant layout: Economics of plant location, Rural Vs Suburban sites, Types of layouts, Types of buildings, Methods of plant layouts (Travel Chat Technique), the concept of Assembly line balancing. Simple problems. **Materials handling**: Principles, Concept of unit load, Palletization and Containerization, Selection of material handling equipment, Types and applications of material handling equipment

UNIT-IV

Work study: Concept of productivity, Method study – Basic steps in method study, Process charts, Diagrams, Models and Templates, Principles of motion economy, Micro motion study, Therbligs, SIMO chart, Work measurement – Stop watch procedure of time study, Performance rating, Allowances, Work sampling, Simple problems.

UNIT-V

Materials management: Introduction, Purchasing, Objectives of purchasing department, Buying techniques, Purchase procedure, Stores and material control, receipt and issue of materials, Store records, Inventory control, EOQ model (simple problems). Quality control: Control charts of variables and attributes. Single and double sampling plans.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3201	
Course Title: Industrial Engineering & Management	
CO-1	Apply management theories in industry
CO-2	Know personnel management techniques to motivate the workers
CO-3	Settle the industrial disputes in the organization
CO-4	Acquire full knowledge on production planning and control procedures
CO-5	Understand the economics of plant layout
CO-6	Aware of material handling principles and equipment
CO-7	Apply maintenance practices
CO-8	Have knowledge on materials management
CO-9	Improve the productivity by applying work study procedures and quality concepts

SYLLABUS: CONTROL SYSTEMS (B17ME3202)

UNIT-I

Introduction: Control systems, Classification of Control systems, Feedback and its effects. Transfer Function, Block Diagram and Signal Flow Graphs

UNIT-II

Mathematical Modelling of Physical Systems: Modelling of mechanical and electrical system elements, Equations of mechanical and electrical systems, Electrical analogous of mechanical systems.

UNIT-III

State-variable analysis: State variables, Matrix representation of state equations, State Transition Matrix, State-Transition Equation, Relationship between state equations and high order differential equations, Relationship between state equations and transfer functions, Characteristic equation, eigen values and eigen vectors.

UNIT-IV

Time Response Analysis: Time response, typical test signals for the time response of control systems, Order of a system, response of first and second order systems for various inputs, Time domain specifications, Type number of control systems, Steady state error, Static error constants

UNIT-V

Frequency Response Analysis: Frequency response, Frequency-domain Analysis of Control Systems: Gain margin, Phase margin. **Stability of control systems**: Stability, Characteristic equation, Methods of determining stability of linear control systems, Routh- Hurwitz criterion, Nyquist stability criterion, Application of the Nyquist criterion.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3202	
Course Title: Control Systems	
CO-1	Classify control systems and explain the needs and effects of feedback in a control system and Compute transfer function of multiple subsystems modeled as block diagram/ signal flow graph.
CO-2	Develop mathematical models for physical systems using the knowledge of fundamental principles of mathematics and control systems.
CO-3	Compute transfer function of multiple subsystems modeled as state space representation.
CO-4	Compute and describe the output response and steady state error of first, second and higher order control systems for standard input signals
CO-5	Determine the stability of a system using Routh Hurwitz and Nyquist criterion.

SYLLABUS: DYNAMICS OF MACHINES (B17ME3203)

UNIT-I

Gyroscopic Couple and Precessional Motion: Precessional and angular motion- gyroscopic couple- effect of gyroscopic couple on an aero plane and on a naval ship, stability of a four wheel vehicle moving in a curved path, stability of a two-wheel vehicle taking a turn..

UNIT-II

Balancing of Rotating and Reciprocating Masses: Balancing of a single rotating mass in the same plane and by two masses in different planes, balancing of several masses revolving in the same plane- Balancing of several masses revolving in different planes- Primary and secondary unbalanced forces of reciprocating masses, Partial balancing of unbalanced primary forces in a reciprocating engine, Partial balancing of locomotives- Effect of partial balancing of reciprocating parts of two cylinder locomotives- Variation of tractive force, Swaying couple and hammer blow- Balancing of primary and secondary forces in multi cylinder in-line engines Direct and reverse cranks- Balancing of V- Engines.

UNIT-III

Vibrations: Definitions- Types of vibrations- Natural frequencies of free longitudinal vibrations of systems having single degree of freedom- Equilibrium method- Energy method and Rayleghy's method. Frequency of damped vibration and forced vibration with damping- , Simple problems on forced damped vibration, Magnification factor. Natural frequency of free transverse vibrations due to point load and uniformly distributed load acting over a simply supported shaft- Transverse vibrations for a shaft subjected to number of point loads- Energy method- Dunkerley's method, Critical speed of a shaft. Natural frequency of free torsional vibrations- Free torsional vibrations of single rotor system, two rotor system and torsionally equivalent system

UNIT-IV

FRICTION: Introduction; Kinds of friction; Laws of friction; Coefficient of friction;; Screw jack; friction of screw ,Pivots and collars;; Rolling friction; Antifriction bearings; Greasy friction; Greasy friction at a journal;; Film friction; **CLUTCHES:** Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch

UNIT-V

TURNING MOMENT DIAGRAMS: Analytical method for velocity and acceleration of piston, angular velocity and acceleration of connecting rod, engine force analysis crank effort and turning moment diagrams – fluctuation of energy – fly wheels. GOVERNERS: Watt, porter and proell governors, spring loaded governors – Hartnell and Hartung with auxiliary springs. sensitiveness, isochronism and hunting Stability

Course Outcomes for Third Year First Semester Course	
Course Code:B17 ME 3203	
Course Title: Dynamics of Machines	
CO-1	Analyze stabilization of sea vehicles, aircrafts and automobile vehicles.
CO-2	Compute frictional losses, torque transmission of mechanical systems.
CO-3	Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement.
CO-4	Understand the importance of governors , bearings, clutches and their applications
CO-5	Understand balancing of reciprocating and rotary masses

SYLLABUS: MACHINE DESIGN (B17ME3204)

UNIT-I

Gears: Classification of gears, Standard tooth systems. Spur, Helical and Bevel gears. Terminology of each. Tooth failure. Face width and beam strength. Lewis equation. Design for dynamic and wear loads. Force analysis of Bevel gears.

UNIT-II

I.C Engine parts: Design of cylinders and heads. Design of pistons, Design of cross-head and design of connecting rods

UNIT-III

Clutches: Torque capacity of single and multi-plate clutches. Design considerations. Energy considerations and Temperature rise friction materials. Cone clutch design, Centrifugal clutches design. **Brakes:** Energy equations. self locking and self energizing conditions of a brake, Band and block brakes. Internal expanding shoe brake design.

UNIT-IV

Sliding contact bearings: Lubrication modes. Temperature effect on viscosity. Journal bearing design. Bearing modulus. McKee equations. Heating of bearings. Collar and thrust bearings. Roller and ball bearings: Static and dynamic load capacity. Equivalent bearing load. Load-life relationships. Load factor. Selection of bearings from manufacturer‟s catalogue.

UNIT-V

Wire ropes: construction, Classification and designation, Stresses in wire ropes, Design for service, advantage of wire ropes over fiber ropes **Chain drives:** terminology and classification, Design procedure for service. Advantages and disadvantages of chain drive over rope drives.

SYLLABUS: ENTERPRENEURSHIP (B17BS3207)
(Open Elective)

UNIT-I

Entrepreneurship: Importance and growth - Characteristics and Qualities of Entrepreneur- Role of Entrepreneurship, Ethics and Social Responsibilities. Women Entrepreneurship: Role & Importance, Problems of Women Entrepreneurs – corporate entrepreneurship – mobility of entrepreneur – entrepreneurial motivation.

UNIT-II

Training: Designing Appropriate Training Programme to inculcate Entrepreneurial Spirit - Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees. Creativity and Entrepreneurship: Sources and Methods of Ideas Planning and Development of Programmes

UNIT-III

Planning and Evaluation of Projects: Growth of Firm – Project identification and selection -Factors inducing growth- - Project Feasibility Study - Post Planning of Project-Project Planning and Control.

UNIT-IV

Small and Micro Enterprises: Importance, definitions – policies and their support to MSMEs - growth and growth strategies – sickness in small business and remedies – small entrepreneurs in International business.

UNIT-V

Institutional Support to Entrepreneur and MSMEs: Role of Government - Role of IDBI,NIESBUD, SISI, DIC - Financial Institutions-Commercial Banks, Entrepreneurial Development Institutes, Universities and other Educational Institutions offering Entrepreneurial Development Programme.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3207	
Course Title: Entrepreneurship (Open Elective)	
CO-1	Students will be able to understand the characteristics of entrepreneur and its role in economic development.
CO-2	Student will be able to gain comprehensive knowledge on women entrepreneurship, rural entrepreneurship and their contribution towards economic development.
CO-3	Students will be familiarizing with project formulation and design.
CO-4	Students will be able to familiarize with the problems and prospectus of India.
CO-5	Student will be able to include and implement Government of India initiatives in supporting skill development programmes.

SYLLABUS: DATA BASE MANAGEMENT SYSTEM (B17CS3213)
(Common to CE & ME)

(Open Elective)

UNIT-I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages – DDL, DML, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems. Introduction to Data base design: Database Design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design: ER to Relational, Introduction to Views, Destroying /Altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational calculus – Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus. SQL: Queries, Constraints, Triggers: Form of Basic SQL Query, UNION,INTERSECT, and EXCEPT, Nested Queries, Aggregate Operators, NULL values Complex Integrity Constraints in SQL, Triggers and Active Data bases, Designing Active Databases.

UNIT-III

Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies-Reasoning about FDs, Normal Forms, Properties of Decompositions, Normalization, Schema Refinement in Database Design, Other Kinds of Dependencies.

UNIT-IV

Transaction Management: Transactions, Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity Transaction Isolation Levels, Implementation of Isolation Levels. Concurrency Control: Lock–Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes. Recovery System-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with loss of nonvolatile storage, Early Lock Release and Logical Undo Operations, Remote Backup systems.

UNIT-V

Storage and Indexing: Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index Data Structures, Comparison of File Organizations. Tree Structured Indexing: Intuition for tree Indexes, Indexed Sequential Access Method (ISAM), B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash- Based Indexing: Static Hashing, Extendible hashing, Linear Hashing, Extendible vs. Linear Hashing.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3213	
Course Title: Database Management System(Open Elective)	
CO-1	Demonstrate the basic elements of a relational database management system.
CO-2	Ability to identify the data models for relevant problems.
CO-3	Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data.
CO-4	Apply normalization for the development of application software

SYLLABUS: WASTE WATER MANAGEMENT (B17CE3207)
(Common to CE&ME)
(Open Elective)

UNIT-I

Water uses by industry – Sources of water for industries – Characteristics of industrial wastes – Industrial water requirements – quality and quantity

UNIT-II

Waste reduction – Volume reduction – Classification of wastes – Equalisation- Neutralisation – Floatation – Precipitation – Heavy metal removal - adsorption – Aerobic and anaerobic biological treatment – reed bed technology.

UNIT-III

Measurement of industrial waste water flow – waste water characterization - Advanced waste reduction technologies – Ozonation – Membrane technologies – Ion exchange – Nutrient removal – recycling, reuse and resources recovery

UNIT-IV

Waste disposal methods- land treatment – water bodies, rivers, oceans – problems of disposal – Common effluent treatment plants- advantages and disadvantages – recirculation of industrial wastes – Effluent disposal methods – sludge treatment – disposal

UNIT-V

Manufacturing process and origin, characteristics, effects and treatment methods of liquid waste from different industries – steel – fertilizers – textiles – paper and pulp industries – oil refineries – coal and gas power plants- tanneries – sugar – textiles – distillery – dairy – food processing - distilleries

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CE 3207	
Course Title: Waste Water Management (Open Elective)	
CO-1	Define the quality of industrial wastes
CO-2	Explain various industrial waste treatment processes
CO-3	Outline the advanced treatment techniques available for industrial wastes
CO-4	Explain the sludge reduction and disposal methodologies
CO-5	Analyze the waste effluent treatment from different case studies

SYLLABUS: COMPUTER GRAPHICS (B17CS3210)

(Open Elective)

UNITI

Introduction: Computer Graphics and their applications: Computer Aided Design, Computer Art, Entertainment, Education and Training, Graphical User Interfaces; Overview of Graphics systems: Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors And Workstations, Input Devices, Hard Copy Devices, Interactive Input Methods, Windows and Icons, Virtual Reality Environments, Graphics Software.

UNIT II

Output primitives :Points and Lines, , Line and Curve Attributes, Color and Gray scale levels, Antialiasing, Loading the Frame buffer, Line function, Line Drawing Algorithms, Circle Generating Algorithms, Ellipse Generating Algorithms, Pixel Addressing, Area Fill Attributes, Filled Area Primitives, Filled Area Functions, Cell Array, Character Generation, Character Attributes, Bundled Attributes, Curve Functions, Parallel Curve Algorithms

UNIT-III

Two Dimensional Transformations: Basic 2D Transformations, Matrix Representations, Homogeneous Coordinates, Composite Transformations, Other Transformations, Transformations between Coordinate Systems, Affine Transformations. Viewing Pipeline and Clipping operations: Viewing Pipeline, Viewing Coordinates & Reference frames, Window-to-Viewport Coordinate Transformation, Two Dimensional Viewing Functions, Clipping and its Operations, Types of clipping operations- Point Clipping, Line Clipping, Polygon Clipping, Curve Clipping,, Text and Exterior Clipping.

UNIT-IV

Three Dimensional Transformations & Projections: Translation, Rotation, Scaling, Other Transformations, Composite Transformations, 3D Transformation Functions, Modeling and Coordinate Transformations, Need for projections, Parallel & Perspective projections, General Projection Transformations.

UNIT-V

Three Dimensional Concepts and Object representations: 3D display methods, 3D Graphics, Polygon Surfaces, Curved Lines and Surfaces, Quadratic Surfaces, Super Quadrics, Blobby Objects, Spline Representations, Bézier Curves and Surfaces, BSpline Curves and Surfaces.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 CS 3210	
Course Title: Computer Graphics (Open Elective)	
CO-1	The students will understand graphics principles and graphics hardware.
CO-2	The students can demonstrate geometrical transformations.
CO-3	The students can create interactive graphics applications and demonstrate computer graphics

SYLLABUS: INDUSTRIAL ROBOTICS (B17ME3205)

(Open Elective)

UNIT-I

INTRODUCTION: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation scheme, work volume, robot drive systems, control systems and dynamic performance, precision of movement. **CONTROL SYSTEM AND COMPONENTS:** basic concepts and motion controllers, control system analysis, robot actuation and feedback components, Positions sensors, velocity sensors, actuators, power transmission systems, robot joint control design

UNIT-II

MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation, forward and inverse transformations, homogeneous transformations, manipulator path control, robot arm dynamics, configuration of a robot controller.

UNIT-III

END EFFECTORS: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics. **MACHINE VISION:** Functions, Sensing and Digitizing-imaging devices, Lighting techniques, Analog to digital single conversion, image storage: Image processing and Analysis-image data reduction, Segmentation, feature extraction, Object recognition. Training the vision system, Robotic application.

UNIT-IV

ROBOT PROGRAMMING: Lead through programming, Robot program as a path in space, Motion interpolation, WAIT, SIGNAL AND DELAY commands, Branching, capabilities and Limitations of lead through methods. **ROBOT LANGUAGES**: Textual robot Languages, Generations of robot programming languages, Robot language structures, Elements and function.

UNIT-V

ROBOT CELL DESGIN AND CONTROL: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detection, Work cell controller. **ROBOT APPLICATION:** Material transfer, Machine loading/unloading, Processing operation, Assembly and Inspection, Future Application.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3205	
Course Title: Industrial Robotics(Open Elective)	
CO-1	Distinguish between fixed automation and programmable automation.
CO-2	Identify various components of robot.
CO-3	Select appropriate type of actuator for a joint.
CO-4	Illustrate robot applications in manufacturing.
CO-5	Analyze kinematics of a robot.

SYLLABUS: GREEN ENGINEERING SYSTEMS (B17ME3206)

(Open Elective)

UNIT-I

INTRODUCTION: SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics. SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors

UNIT-II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney. WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT-III

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects. **GEOTHERMAL ENERGY**: Resources, types of wells, methods of harnessing the energy, potential in India. **OCEAN ENERGY**: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-IV

ENERGY EFFICIENT SYSTEMS: ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management. MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps

UNIT-V

ENERGY EFFICIENT PROCESSES: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3206	
Course Title: Green Engineering Systems(Open Elective)	
CO-1	Understand the principles and working of solar energy and solar energy solar energy collection.
CO-2	Understand the principles of solar energy storage and applications of solar energy and wind energy.
CO-3	Understand the principles and working of biomass, geo thermal and ocean energies and appreciate their significance in view of their importance in the current scenario and their potential future applications.
CO-4	Understand the principles and working of energy efficient systems like electrical and mechanical systems.
CO-5	Understand the principles and working of energy efficient processes.

SYLLABUS: COMPUTER AIDED DESIGN
(B17ME3207)

UNIT-I

Fundamentals of CAD - Introduction - The design process - Application of computers for design - Operating systems - Hardware in CAD: The design work station - I/O Devices - CAD system configuration - Creating database for manufacturing - Benefits of CAD.

UNIT-II

Interactive Computer Graphics - Graphic display devices- Graphics system- Graphics standards - Graphical user interface- Transformation systems- windowing - clipping - 2D and 3D transformations - Linear transformation- Geometric Modeling - Modeling Techniques - Wire frame Modeling - Surface Modeling - 3 D Solid Modeling.

UNIT-III

Introduction to Finite Element Analysis - CAD techniques to finite element data preparation Automatic mesh generation- presentation of results - 3-dimensional shape description and mesh generation- CAD applications of FEM.

UNIT-IV

CAD applications and exposure to CAD packages: Simple examples of computer aided drafting, design and analysis - Introduction to simple machine elements - Analysis of cross sectional area, centroid & moment of inertia- Kinematics of crank- slider mechanism and other simple design applications. Introduction to CAD packages like ANSYS, NASTRAN, NISA-II.

UNIT-V

Introduction to Artificial Intelligence - Applications of AI in design and CAD. Expert system: Structure and characteristics of expert system, building an expert system, knowledge representation, benefits of expert system.

Course Outcomes for Third Year First Semester Course	
Course Code:B17 ME 3207	
Course Title: Computer Aided Design	
CO-1	Analyze and use engineering computer graphics and geometric modelling techniques for mechanical engineering applications.
CO-2	Able to understand and apply theories, methods and procedures for complex-shapes part design.
CO-3	Apply advanced modelling and computational tools for complex part and shape design and analysis.
CO-4	Select and use various engineering design procedures for mechanical design problems involving complex shapes.
CO-5	Execute professional engineering CAD projects for mechanical engineering applications in the current industrial practice.

SYLLABUS: INDUSTRIA LENGINEERING LAB (B17ME3208)

LIST OF EXPERIMENTS

1. To measure the skill and dexterity in the movement of Wrist and Fingers using pin board.
2. To measure the Heart beat using Stethoscope.
3. To show that the sample means from a normal universe follow a normal distribution.
4. To draw the control chart for fraction defective for a given lot of marble balls.
5. To determine the cycle time using PMTS.
6. To draw two handed process charts for (i). Bolt, Washer and nut assembly; (ii). Assembly of electric tester.
7. To study the changes in heart rate for different subjects using Tread mill.
8. To draw Multiple Activity chart using an electric toaster.
9. To determine the percentage utilization using work sampling.
10. To study the process capability of a given process.
11. To measure the Heart rate during working and recovery periods of the subjects under different loads, using Bicycle ergometer.
12. To draw flow process charts on activities in Workshop/ Laboratory/Office.
13. To determine the time required to perform motion sequence using work factor system.
14. To draw SIMO charts for (i). Ball point pen assembly; (ii). Electric plug assembly.
15. To conduct time study of the bulb holder assembly operation of the existing method.
16. To collect the anthropometrics data using `Anthropolometer'

Course Outcomes for Third Year First Semester Course	
Course Code:B17 ME 3208	
Course Title: Industrial Engineering Lab	
CO-1	Students will be able to find the quality of the product using different charts.
CO-2	Can improve the method of doing work by applying principle of motion economy and method study charts.
CO-3	Can find the standard time required for completing a job by different methods.
CO-4	Understands the basic probability distributions.
CO-5	Understands the impact of work on the human body and also the physiological constraints of the body

SYLLABUS: FLUID MECHANICS AND MACHINERY LAB (B17ME3209)

LIST OF EXPERIMENTS

1.Calibration of flow meters: (a) Venturi meter; (b) Orifice meter; (c) Nozzle meter.
2. Determination of coefficient of discharge for: (a) small orifice; (b) cylindrical mouth piece.
3. Finding coefficient of discharge for: (a) rectangular notch; (b) triangular notch; (c) trapezoidal notch.
4. To draw the performance characteristics of Centrifugal pump.
5. To find the specific speed of: (a) Pelton turbine; (b) Francis turbine.
6. To draw the characteristic curves for reciprocating pump.
7. To draw the pressure distribution and finding coefficient of drag for a bluff body and an Aero foil.
8. To draw the characteristic curves for the hydraulic ram.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 ME 3209	
Course Title: Fluid Mechanics and Machinery Lab	
CO-1	The student gets complete knowledge on fluid mechanics, hydraulic turbines and pumps.
CO-2	The student learns the complete calculation procedures for designing hydraulic turbines, and pumps.
CO-3	The student is prepared to work in industry immediately after this course.

SYLLABUS: EMPLOYABILITY SKILLS (B17BS3201)

(Common to all Branches)

1

Part-A: Verbal Aptitude and Soft Skills-II

UNIT-I (VA)

Sentence Improvement (finding a substitute given under the sentence as alternatives), Sentence equivalence (completing a sentence by choosing two words either of which will fit in the blank), cloze test (reading the written discourse carefully and choosing the correct options from the alternatives and filling in the blanks), summarizing and paraphrasing.

UNIT-II (VA)

Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the author,,s intention of 51 writing a passage), strategies for quick reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

UNIT-III (VA)

Punctuation, discourse markers, general Essay writing, writing Issues and Arguments (with emphasis on creativity and analysis of a topic), paragraph writing, preparing reports, framing a Statement of purpose Letters of Recommendation,,, business letter writing, email writing, writing letters of complaints/responses. picture perception and description, book review.

UNIT-IV (VA)

Just a minute sessions, reading news clippings in the class, extempore speech, telephone etiquette, making requests/suggestions/complaints, elocutions, debates, describing incidents and developing positive non verbal communication, story narration, product description.

UNIT-V (SS)

Employability Skills – Significance — Transition from education to workplace - Preparing a road map for employment – Getting ready for the selection process, Awareness about Industry / Companies – Importance of researching your prospective workplace - Knowing about Selection process - Resume Preparation: Common resume blunders – tips, Resume Review, Group Discussion: Essential guidelines – Personal Interview: Reasons for Rejection and Selection.

Part-B: Quantitative Aptitude-II

UNIT I: Averages, mixtures and allegations, Data interpretation Understanding of AM, GM, HM-Problems on averages, Problems on mixtures standard method. Importance of data interpretation: Problems of data interpretation using line graphs, Problems of data interpretation using bar graphs, Problems of data interpretation using pie charts, Problems of data interpretation using others.

UNIT II: Puzzle test, blood Relations, permutations, Combinations and probability Importance of puzzle test, Various Blood relations-Notation to relations and sex making of family Tree diagram, Problems related to blood relations, Concept of permutation and combination, Problems on permutation, Problems on combinations, Problems involving both permutations and combinations, Concept of probability-Problems on coins, Problems on dice, Problems on cards, Problems on years.

UNIT III: Periods, Clocks, Calendars, Cubes and cuboids Deriving the formula to find the angle between hands for the given time, finding the time if the angle is known, Faulty clocks, History of calendar-Define year, leap year, Finding the day for the given date, Formula and method to find the day for the given date in easy way, Cuts to cubes, Colors to cubes, Cuts to cuboids, Colors to cuboids.

UNIT IV: Puzzles Selective puzzles from previous year placement papers, sitting arrangement, problems-circular arrangement, linear arrangement, different puzzles.

UNIT V: Geometry and Mensuration Introduction and use of geometry-Lines, Line segments, Types of angles, Intersecting lines, Parallel lines, Complementary angles, supplementary angles, Types of triangles-Problems on triangles, Types of quadrilaterals-Problems on quadrilaterals,
Congruent triangles and properties, Similar triangles and its applications, Understanding about circles-Theorems on circles, Problems on circles, Tangents and circles, Importance of mensuration-Introduction of cylinder, cone, sphere, hemi sphere.

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3201	
Course Title: Employability Skills	
CO-1	Construct coherent, cohesive and unambiguous verbal expressions in both oral and written discourses.
CO-2	Analyze the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences
CO-3	Write paragraphs on a particular topic, essays (issues and arguments), e mails, summaries of group discussions, reports, make notes, statement of purpose(for admission into foreign universities), letters of recommendation(for professional and educational purposes).
CO-4	Converse with ease during interactive sessions/seminars in their classrooms, compete in literary activities like elocution, debates etc., raise doubts in class, participate in JAM sessions/versant tests with confidence and convey oral information in a professional manner.
CO-5	Participate in group discussions/group activities, exhibit team spirit, use language effectively according to the situation, respond to their interviewer/employer with a positive mind, tailor make answers to the questions asked during their technical/personal interviews, exhibit skills required for the different kinds of interviews (stress, technical, HR) that they would face during the course of their recruitment process.

SYLLABUS: BASICCODING (B17BS3202)
(Common to CE& ME)

UNIT I Review of Programming constructs Programming Environment, Expressions formation, Expression evaluation, Input and Output patterns, Control Structures, Sequential branching, Unconditional branching, Loop Structures, Coding for Pattern Display.

UNIT II Introduction to Linear Data, strings and pointers Structure of linear data, Operation logics, Matrix forms and representations, Pattern coding, Working on character data, Compiler defined methods, Substitution coding for defined methods, Row Major representation, Column Major representation, Basic searching and sorting Methods.

UNIT III Functions, Recursions and Storage Classes Functions – Introduction to modular programming – Function Communication - Pass by value, Pass by reference – Function pointers – Recursions – Type casting – Storage classes Practice: programs on passing an array and catching by a pointer, function returning data, comparison between recursive and Iterative solutions. Data referencing mechanisms: Pointing to diff. data types, Referencing to Linear data, Run time memory allocation, Named locations Vs pointed locations, Referencing a 2D-Matrix

UNIT IV User-defined data types, Pre-processor Directives and standard storage Need for user-defined data type – structure definition – Structure declaration – Array within a Structure – Array of Structures – Nested Structures - Unions – Declaration of Union data type, Struct Vs Union - Enum – Pre-processor directives , Standard storage methods, Operations on file, File handling methods, Orientation to Object oriented programming Practice: Structure padding, user-defined data storage and retrieval programs

UNIT V Operating system principles and Database concepts Introduction to Operating system principles, Process scheduling algorithms, Deadlock detection and avoidance, Memory management, Networking: Introduction to Networking, OSI Model Vs. TCP/IP suite, Datalink layer, Internet layer, DVR Vs. LSR, Transport Layer, Application Layer

Course Outcomes for Third Year First Semester Course	
Course Code: B17 BS 3202	
Course Title: Basic Coding	
CO-1	Know about Control Structures, Loop Structures and branching in programming.
CO-2	Know about various searching and sorting methods.
CO-3	Know about Functions, Recursions and Storage Classes.
CO-4	Know about Structures and Unions.
CO-5	Know different Operating System concepts.
CO-6	Differentiate OSI Model Vs. TCP/IP suite.

CIVIL ENGINEERING

Regulation: R17	M.Tech. I - Semester
CIVIL ENGINEERING (STRUCTURAL ENGINEERING) (under Choice Based Credit System / Elective Course System)	
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)	

CodeNo.	Name of the Subject	C	Cr	L	Tutorial Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
M17ST 1101	Advanced Mathematics	ES	3	3	1	--	30	70	100
M17ST 1102	Theory of Elasticity	ES	3	3	1	--	30	70	100
M17ST 1103	Matrix methods of Structural Analysis	ES	3	3	1	--	30	70	100
M17ST 1104	Structural Dynamics	ES	3	3	1	--	30	70	100
#ELE-1	Elective-I	ES	3	3	1	--	30	70	100
#ELE-2	Elective-II	ES	3	3	1	--	30	70	100
M17ST 1111	Advanced Structural Engineering Laboratory	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	Course
#ELE-1	M17ST 1105	Sub-StructureDesign
	M17ST 1106	ExperimentalStressAnalysis
	M17ST 1107	AdvancedReinforcedconcreteDesign
#ELE-2	M17ST 1108	PlasticAnalysisandDesign
	M17ST 1109	AnalysisandDesignofTallBuildings
	M17ST 1110	RepairandRehabilitationofStructures

SYLLABUS: ADVANCED MATHEMATICS (M17 ST 1101)

UNIT-I

Applied partial Differential Equations: One-dimensional Heat equation Cartesian, cylindrical andspherical coordinates (problems having axi-symmetry). Two-dimensional Laplace Equation inCartesian, cylindrical and spherical coordinates (problems having axi-symmetry) – Analytical solution by separation of variables technique.

UNIT-II

Numerical solutions to Heat and Laplace Equations in Cartesian coordinates using finite–differences. Implicit methods, Crank Nicholsen Method, Jacobi Method, Guass Seidal method.

UNIT-III

Applied Statistics: Regression and correlation analysis–Method of Least squares–Curve fitting – Curvilinear Regression – Non-linear curves – correlation coefficient – Correlation of grouped bi-variate data–coefficient of determination Multiple Regression–partial Regression coefficients.

UNIT-IV

Tests of significance –Analysis of variancefor regression– Multiple correlation coefficients–Multiplelinear regression with two independentvariables.

UNIT-V

Linear Programming Problem Formation, Graphical Method, Simplex method, artificial variable method-Big-M method-Two Phase Method. Non Linear Programming Problem Gradient method, Steepest Ascent Descent Methods

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1101	
Course Title: Advanced Mathematics	
CO-1	Obtain analytical solution of the two-dimensional partial differentials they come across in simple applications.
CO-2	Get numerical solutions for One – dimensional heat and two-dimensional Laplace equations by different methods.
CO-3	Perform correlation and regression analysis for different types of data they come across.
CO-4	Formulate a linear programming problem and solve it by an appropriate method. Analyse non-linear programming problems by some specific methods.
CO-5	Obtain analytical solution of the two-dimensional partial differentials they come across in simple applications.

SYLLABUS: THEORY OF ELASTICITY (M17 ST 1102)

UNIT-I

Elasticity – Notation for forces and stresses – components of stresses and strains – Hooke"s Law - Plane Stress – Plane strain – Differential Equations of equilibrium – Boundary conditions – Compatibility equations - Stress function – Boundary Conditions.

UNIT-II

Two dimensional problems in rectangular co-ordinates – Solution by polynomials – Saint Venant"s principle – Determination of displacements – Bending of simple beams – Application of Fourier series for two dimensional problems for gravity loading

UNIT-III

Two dimensional problems in polar co-ordinates - General equations in polar co-ordinates – Stress distribution for problems having symmetrical about an axis - Strain components in polar coordinates – Displacements for symmetrical stress distributions - Stresses for plates with circular holes subjected to far field tension – stress concentration factor.

UNIT-IV

Analysis of stress and strain in three dimension - Principal stresses – Stress ellipsoid and stress director surface – Determination of principal stresses - Maximum shear stress – Homogeneous Deformation – General Theorems - Differential equations of equilibrium – Conditions of compatibility – Equations of equilibrium in terms of displacements– Principle of superposition – Uniqueness of solution –Reciprocal theorem

UNIT-V

Torsion of prismatical bars – Bars with elliptical cross section – Other elementary solution –Membrane analogy – Torsion of rectangular bars – Solution of torsional problems by energymethod.

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1102	
Course Title: Theory of Elasticity	
CO-1	Analyze the stresses and strains for two dimensional and three dimensional elements.
CO-2	Understand the equilibrium and compatibility conditions.
CO-3	Solve the problems on Torsion for different shaped bars.

SYLLABUS: MATRIX METHODS OF STRUCTURAL ANALYSIS (M17ST1103)

UNIT-I

Introduction of matrix methods of analysis – Static and kinematic indeterminacy – Degree of freedom – Structure idealization-stiffness and flexibility methods – Suitability: Element stiffness matrix for truss element, beam element and Torsional element- Element force – displacement equations

UNIT-II

Stiffness method – Element and global stiffness equation – coordinate transformation and globalassembly – structure stiffness matrix equation – analysis of simple pin jointed trusses – continuousbeams–rigid jointed planeframes

UNIT-III

Stiffness method for Grid elements – development of stiffness matrix – coordinate transformation. Examples of grid problems– tapered and curved beams

UNIT-IV

Additional topics in stiffness methods – discussion of band width – semi band width – static condensation – sub structuring –Loads between joints-Support displacements- inertial and thermal stresses-Beamson elastic foundation by stiffness method.

UNIT-V

Space trusses and frames - Member stiffness for space truss and space frame– Transformation matrix from Local to Global – Analysis of simple trusses, beams and frames

Course Outcomes for First Year First Semester Course	
Course Code:M17 ST 1103	
Course Title:Matrix methods of Structural Analysis	
CO-1	Analyze various beams by the matrix methods at different loading conditions.
CO-2	Analyze various Plane truss problems by the matrix methods.
CO-3	Analyze Plane Frames by the matrix methods at different loading conditions.

SYLLABUS: STRUCTURAL DYNAMICS (M17 ST 1104)

UNIT-I

Introduction to Structural Dynamics: Fundamental objective of Dynamic analysis – Types of prescribed loadings – methods of Discretization – Formulation of the Equations of Motion.

UNIT-II

Theory of Vibrations: Introduction – Elements of a Vibratory system– Degrees of Freedom ofcontinuous systems - Oscillatory motion – Simple Harmonic Motion– Free Vibrations of Single Degree of Freedom (SDOF) systems – Undamped and Damped – Critical damping – Logarithmicdecrement – Forced vibrations of SDOF systems – Harmonic excitation – Dynamic magnificationfactor–Bandwidth.

UNIT-III

Single Degree of Freedom System: Formulation and Solution of the equation of Motion –Freevibration response – Response to Harmonic, Periodic, Impulsive and general dynamic loadings –Duhamel integral.

UNIT-IV

Multi Degree of Freedom System: Selection of the Degrees of Freedom– Evaluation of Structural Property Matrices – Formulation of the MDOF equations of motion - Undamped free vibrations –Solution of Eigen value problem for natural frequencies and mode shapes – Analysis of dynamic response-Normal coordinates.

UNIT-V

Continuous Systems: Introduction – Flexural vibrations of beams – Elementary case –Equation ofmotion – Analysis of undamped free vibration of beams in flexure – Natural frequencies and mode shapes of simple beams with different end conditions.

Course Outcomes for First Year First Semester Course	
Course Code:M17 ST 1104	
Course Title: Structural Dynamics	
CO-1	Solve the problems on Single degree of freedom.
CO-2	Understand the difference between harmonic loading and impulse loading and the related analysis procedures.
CO-3	Evaluate the structural properties, mode shapes for different structures.

SYLLABUS: SUB-STRUCTURE DESIGN (M17 ST 1105)

(ELECTIVE-I)

UNIT-I

Soil Exploration – Importance, Terminology, planning - Geophysical methods. Borings, location, spacing and depth, methods of boring including drilling, stabilization of boreholes, boring records

UNIT-II

Soil sampling – Methods of sampling -Types of samples and samplers-cleaning of bore holes, preservation, labeling and shipment of samples - Design considerations of open drive samplers..

UNIT-III

Shallow Foundations –Bearing capacity – General bearing capacity equation, Meyer hof"s, Hansen"s and Vesic"s bearing capacity factors - Bearing capacity of stratified soils - Bearing capacity based on penetration resistance- safe bearing capacity and allowable bearing pressure. (Ref: IS -2131 & IS 6403)

UNIT-IV

Types and choice of type. Design considerations including location and depth, Proportioning of shallow foundations- isolated and combined footings and mats - Design procedure for mats. Floating foundation- Fundamentals of beams on Elastic foundations..(Ref: IS -456 & N.B.C. relevant volume).

UNIT-V

Pile foundations-Classification of piles-factors influencing choice-Load -carrying capacity of single piles in clays and sands using static pile formulae- á - â - and λ - methods –Dynamic pile formulae-limitations-Monotonic and cyclic pile load tests – Under reamed piles. Pile groups -Efficiency of pile groups- Different formulae-load carrying capacity of pile groups in clays and sands – settlement of pile groups in clays and sands – Computation of load on each pile in a group.

Course Outcomes for First Year First Semester Course	
Course Code:M17 ST 1105	
Course Title:Sub-Structure Design (ELE- I)	
CO-1	Plan a detailed soil exploration programme.
CO-2	Apply various methods for estimating bearing capacity of different types of foundations.
CO-3	Estimate load capacity of single piles and groups of piles

SYLLABUS: EXPERIMENTAL STRESS ANALYSIS (M17 ST 1106)

(ELECTIVE-I)

UNIT-I

Introduction and Strain measurement methods – Model & Prototype– Dimensional analysis Factors influencing model design – Scale factors and Model material properties – Methods of model design. Definition of strain and its relation to experimental determinations - properties of strain gauge systems – Mechanical, Optical, Acoustic and Pneumatic types.

UNIT-II

Electrical resistance strain gages: Introduction – gauge construction– strain gauge adhesives -mounting methods – gauge sensitivities and gage factor – performance characteristics of wire andfoil strain gauges – environmental effects. Analysis of strain gauge data– the three elementrectangularrosette– thedeltarosette– correction fortransversesensitivity.

UNIT-III

Non – destructive testing: Introduction – objectives of non-destructive testing. Ultrasonic pulsevelocity method – Rebound Hammer method (Concrete hammer) – Acoustic Emission-applicationtoassessment ofconcretequality.

UNIT-IV

Theory of photo elasticity: Introduction – temporary double refraction– Index ellipsoid and stressellipsoid– thestressopticlaw–effectsofstressedmodelinapolariscopeforvariousarrangements-fringesharpening.

UNIT-V

Two dimensional photo elasticity: Introduction – iso-chromatic fringe patterns – isoclinic fringepatterns – compensation techniques – calibration methods – separation methods – materials forphoto-elasticity– properties of photo-elastic materials.

Course Outcomes for First Year First Semester Course	
Course Code:M17 ST 1106	
Course Title:Experimental Stress Analysis (ELE- I)	
CO-1	Know the working principle of strain gauges.
CO-2	Do the model analysis using different theorems.
CO-3	Know the concepts of photo elasticity and its applications.

SYLLABUS: ADVANCED REINFORCED CONCRETE DESIGN (M17ST1107)
(ELECTIVE-I)

UNIT-I

Deflection of Reinforced Concrete Beams and Slabs: Introduction, Short-term deflection of beams and slabs, Deflection due to imposed loads, Short-term deflection of beams due to applied loads, Calculation of deflection by IS 456, Deflection of continuous beams by IS 456, Deflection of slabs.

UNIT-II

Estimation of Crack width in Reinforced Concrete Members: Introduction, Factors affecting crack width in beams, Mechanisms of flexural cracking, Calculation of crack width, Simple empirical method, Estimation of crack width in beams by IS 456, Shrinkage and thermal cracking.

UNIT-III

Redistribution of Moments in Reinforced Concrete Beams: Introduction, Redistribution of moments in fixed beam, Positions of points of contraflexures, Conditions for moment redistribution, Final shape of redistributed bending moment diagram, Moment redistribution for a two-span continuous beam, Advantages and disadvantages of moment redistribution, Modification of clear distance between bars in beams (for limiting crack width) with), Relation of reinforced concrete sections.ψredistribution, Moment-curvature (M - Approximation Analysis of Grid Floors: Introduction, Analysis of flat grid floors, Analysis of rectangular grid floors by Timoshenko"s plate theory. Analysis of grid by stiffness matrix method, Analysis of grid floors by equating joint deflections, Comparison of methods of analysis, Detailing of steel in flat grids..

UNIT-IV

Design of Flat Slabs: Introduction, Proportioning of Flat Slabs, Determination of Bending moment and Shear Force, Direct Design method, Equivalent Frame method, Slab Reinforcement.

UNIT-V

Design of Reinforced Concrete Members for Fire Resistance: Introduction, ISO 834 standard heating conditions, Grading or classifications, Effect of high temperature on steel and concrete, Effect of high temperatures on different types of structural members, Fire resistance by structural detailing from tabulated data, Analytical determination of the ultimate bending moment, Capacity of reinforced concrete beams under fire, Other considerations..

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1107	
Course Title: Advanced Reinforced concrete Design (ELE- I)	
CO-1	Estimate the crack width and deflection with regard to the serviceability.
CO-2	Analyze and design a grid floor system.
CO-3	Analyze and design a flat slab system.
CO-4	Analyze and design of concrete structures against fire resistance, according to ISO834 standards.

SYLLABUS: PLASTIC ANALYSIS AND DESIGN (M17 ST 1108)

(ELECTIVE-II)

UNIT-I

Introduction and basic hypothesis: Concepts of stress and strain – relation of steel Moment curvature relation-basic difference between elastic and plastic analysis with examples- Yield condition, idealizations, collapse criteria- Virtual work in the elastic-plastic state-Evaluation of fully plastic moment and shape factors for the various practical sections

UNIT-II

Method of Limit Analysis: Introduction to limit analysis of simply supported fixed beams and continuous beams, Effect of partial fixity and end, invariance of collapse loads, basic theorems of limit analysis, rectangular portal frames, gable frames, grids, superposition of mechanisms, drawing statistical bending moment diagrams for checks.

UNIT-III

Limit design Principles: Basic principles, limit design theorems, application of limit design theorems, trial and error method, method of combining mechanisms, plastic moment distribution method, load replacement method, continuous beams and simple frames designs using above principles.

UNIT-IV

Deflection in Plastic beams and frames: Load deflection relations for simply supported beams, deflection of simple pin based and fixed based portal frames, method of computing deflections.

UNIT-V

Minimum weight Design: Introduction to minimum Weight and linear Weight functions-Foulkes theorems and its geometrical analogue and absolute minimum weight design.

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1108	
Course Title:Plastic Analysis and Design (ELE- II)	
CO-1	Analyze the S.S.B and fixed beams by limit design.
CO-2	Design the continuous beams and simple frames.
CO-3	To compute the deflections for S.S.B,fixed portal frames.

SYLLABUS: ANALYSIS AND DESIGN OF TALL BUILDINGS(M17 ST 1109)
(ELECTIVE-II)

UNIT-I

Design Criteria Philosophy, Materials – Modern concepts – High Performance Concrete, Fibre Reinforced Concrete, Light weight concrete, Self Compacting Concrete

UNIT-II

Gravity Loading – Dead load, Live load, Impact load, Construction load, Sequential loading. Wind Loading – Static and Dynamic Approach, Analytical method, Wind Tunnel Experimental methods.Earthquake Loading – Equivalent lateral Load analysis, Response Spectrum Method, Combination ofLoads.

UNIT-III

Behavior of Structural Systems- Factors affecting the growth, height and structural form, Behaviour of Braced frames, Rigid Frames, In-filled frames, Shear walls, Coupled Shear walls, Wall–Frames, Tubular, Outrigger braced, Hybrid systems.

UNIT-IV

Analysis and Design- Modeling for approximate analysis, Accurate analysis and reduction techniques, Analysis of structures as an integral unit, Analysis for member forces, drift and twist. Computerized 3D analysis. Design for differential movement, Creep and Shrinkage effects, Temperature Effects and Fire Resistance.

UNIT-V

Stability Analysis- Overall buckling analysis of frames, wall–frames, Approximate methods, Second order effect of gravity loading, P–Delta Effects, Simultaneous first order and P-Delta analysis, Translational instability, Torsional Instability, Out of plumb effects, Effect of stiffness of members and foundation rotation in stability of structures.

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1109	
Course Title: Analysis and Design of Tall Buildings (ELE- II)	
CO-1	Know the types of tall buildings.
CO-2	Analyze the plane frame systems by different methods.

REPAIR AND REHABILITATION OF STRUCTURES (M17 ST 1110)
(ELECTIVE-II)

UNIT-I

Materials for repair and rehabilitation -Admixtures- types of admixtures-purposes of using admixtures-chemical composition- Natural admixtures- Fibres- wraps- Glass and Carbon fibre wraps- Steel Plates-Non destructive evaluation: Importance- Concrete behavior under corrosion, disintegrated mechanisms- moisture effects and thermal effects – Visual investigation Acoustical emission methods- Corrosion activity measurement- chloride content– Depth of carbonation- Impact echo methods- Ultrasound pulse velocity methods- Pull out tests.

UNIT-II

Strengthening and stabilization- Techniques- design considerations-Beam shear capacity strengthening- Shear Transfer strengthening-stress reduction techniques- Column strengthening flexural strengthening- Connection stabilization and strengthening, Crack stabilization.

UNIT-III

Bonded installation techniques- Externally bonded FRP- Wet layup sheet, bolted plate, near surface mounted FRP, fundamental debonding mechanisms-intermediate crack debonding-CDC debonding- plate end debonding- strengthening of floor of structures.

UNIT-IV

Fibre reinforced concrete- Properties of constituent materials- Mix proportions, mixing and casting methods-Mechanical properties of fiber reinforced concrete- applications of fibre reinforced concretes-Light weight concrete- properties of light weight concrete- No fines concrete- design of light weight concrete- Flyash concrete-Introduction- classification of fly ash properties and reaction mechanism of flyash- Properties of flyash concrete in fresh state and hardened state- Durability of flyash concretes.

UNIT-V

High performance concretes- Introduction- Development of high performance concretes Materials of high performance concretes-Properties of high performance concretes- Self Consolidating concrete-properties-qualifications.

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1110	
Course Title: Repair and Rehabilitation of Structures (ELE- II)	
CO-1	Assess the damage intensity.
CO-2	Select proper rehabilitation and repair measures for different types of deteriorations.
CO-3	Apply the Seismic Retrofitting techniques on reinforced concrete building.

ADVANCED STRUCTURAL ENGINEERING LABORATORY (M17 ST 1111)

1. Strain measurement-Electrical resistance strain gauges
2. Nondestructive testing- Impact Hammer test, UPV test
3. Qualifications tests on Self compaction concrete-LBox test, J Box test, U box test, SlumpTest.
4. Tests on Buckling of columns–South well plot
5. Repair and rehabilitation of concrete beams
6. Chemical Analysis of water for suitability in concreting with and without Reinforcement.
7. Chemical Analysis of sand and Aggregate for Suitability in Construction.

NOTE: A minimum of five experiments from the above set have to be conducted.

Course Outcomes for First Year First Semester Course	
Course Code: M17 ST 1111	
Course Title: Advanced Structural Engineering Laboratory	
CO-1	Measure strains in concrete elements by Electrical resistance strain gauges.
CO-2	Conduct qualifying tests for Self compaction concrete.
CO-3	Conduct Chemical Analysis of water and Aggregate for Suitability in concreting with and without Reinforcement.

Regulation: R17					M.Tech. II - Semester				
CIVIL ENGINEERING(STRUCTURAL ENGINEERING) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name Of The Subject**	**C**	**Cr**	**L Hrs**	**T Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17ST1201	Theory of Plates and Shells	ES	3	3	1	--	30	70	100
M17ST1202	Finite Element Methods of Analysis	ES	3	3	1	--	30	70	100
M17ST1203	Earthquake Resistant Design of Structures	ES	3	3	1	--	30	70	100
M17ST1204	Structural Stability	ES	3	3	1	--	30	70	100
#ELE-3	Elective-III	ES	3	3	1	--	30	70	100
#ELE-4	Elective-IV	ES	3	3	1	--	30	70	100
M17 ST1211	Computer applications in structural Engineering Lab	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	**Course**
#ELE-3	M17ST 1205	Reliability Analysis and Design
	M17ST 1206	Prestressed Concrete
	M17ST 1207	Optimization Techniques
#ELE-4	M17ST 1208	Industrial Structures
	M17ST 1209	Bridge Engineering
	M17ST 1210	Earth Retaining Structures

SYLLABUS:THEORY OF PLATES AND SHELLS (M17 ST 1201)

UNIT-I

Derivation of governing differential equation for plate– in plane bending and transverse bending effects-Rectangular plates: Plates under various loading conditions like concentrated, uniformly distributed load and hydrostatic pressure. Navier and Levy"s type of solutions for various boundary condition.

UNIT-II

Circular plates: Symmetrically loaded, circular plates under various loading conditions, Annular plates..

UNIT-III

Introduction to Shells- Single and double curvature- Equations of Equilibrium of Shells: Derivation of stress resultants, Principles of membrane theory and bending theory.

UNIT-IV

Cylindrical Shells: Derivation of the governing DKJ equation for bending theory, details of Schorer"s theory. Application to the analysis and design of short and long shells. Use of ASCE Manual coefficients for the design.

UNIT-V

Beam theory of cylindrical shells: Beam and arch action. Design of diaphragms – Geometry analysis and design of elliptic Paraboloid, Conoidal and Hyperbolic Paraboloid shapes by membrane theory.

Course Outcomes for First Year Second Semester Course	
Course Code:M17ST 1201	
Course Title: Theory of Plates and Shells	
CO-1	Analyze and design for plates for different loadings.
CO-2	Analyze and design of shells.
CO-3	Explain the concept of theory of cylindrical shells.

SYLLABUS: FINITE ELEMENT METHODS OFANALYSIS (M17ST1202)

UNIT-I

Introduction: Review of stiffness method- Principle of Stationary potential energy-Potential energy of an elastic body- Rayleigh-Ritz method of functional approximation – variational approaches-weighted residual methods.

UNIT-II

Finite Element formulation of truss element: Stiffness matrix- properties of stiffness matrix – Selection of approximate displacement functions-solution of a plane truss- transformation matrix and stiffness matrix for a 3-D truss- Inclined and skewed supports- Galerkin"s method for 1-D truss – Computation of stress in a truss element.

UNIT-III

Finite element formulation of Beam elements: Beam stiffness-assemblage of beam stiffness matrix- Examples of beam analysis for concentrated and distributed loading- Galerkin"s method - 2-D Arbitrarily oriented beam element – inclined and skewed supports – rigid plane frame examples

UNIT-IV

Finite element formulation for plane stress, plane strain and axisymmetric problems Derivation of CST and LST stiffness matrix and equations-treatment of body and surface forces-Finite Element solution for plane stress and axi symmetric problems- comparison of CST and LST elements –convergence of solution-interpretation of stresses

UNIT-V

Iso-parametric Formulation: An iso parametric bar element- plane bilinear iso parametric element – quadratic plane element - shape functions, evaluation of stiffness matrix, consistent nodal load vector - Gauss quadrature- appropriate order of quadrature – element and mesh instabilities – spurious zero energy modes, stress computation- patch test.

Course Outcomes for First Year Second Semester Course	
Course Code:M17ST 1202	
Course Title:Finite Element Methods of Analysis	
CO-1	Understand the fundamentals of Finite element method.
CO-2	Derive the solution of the problems of 1D and 2D beefed.
CO-3	Apply the concept of iso-parametric formulation for solving problems.
CO-4	Derive the shape functions for higher order elements.

SYLLABUS: EARTH QUAKE RESISTANT DESIGN OF STRUCTURES

(M17 ST 1203)

UNIT-I

Engineering seismology – rebound theory – plate tectonics – seismic waves - earthquake size and various scales – local site effects – Indian seismicity – seismic zones of India – theory of vibrations– near ground and far ground rotation and their effects.

UNIT-II

Seismic design concepts – EQ load on simple building – load path – floor and roof diaphragms–seismic resistant building architecture – plan configuration – vertical configuration – poundingeffects – mass and stiffness irregularities– torsion in structural system-Provision of seismiccode (IS1893 & 13920)– Building system– frames – shear wall– braced frames– layoutdesign of Moment Resisting Frames(MRF) – ductility of MRF – Infill wall – Non-structuralelements.

UNIT-III

Calculation of EQ load – 3D modeling of building systems and analysis (theory only) Designand ductile detailing of Beams and columns of frames Concept of strong column weak beams,Designand ductile detailingof shear walls

UNIT-IV

Cyclic loading behavior of RC, steel and pre- stressed concrete elements - modern concepts-Base isolation – Adaptive systems–case studies.

UNIT-V

Retrofitting and restoration of buildings subjected to damage due to earthquakes- effects ofearthquakes – factors related to building damages due to earthquake- methods of seismic retro fitting-restoration of buildings.

Course Outcomes for First Year Second Semester Course	
Course Code: M17ST 1203	
Course Title:Earthquake Resistant Design of Structures	
CO-1	Describe various terms of engineering seismology.
CO-2	Design earthquake-resistant structures.
CO-3	Gain the knowledge on seismic code provisions and detailing.
CO-4	Acquire the knowledge in structural irregularities in seismic planning and shear wall concept.

SYLLABUS: STRUCTURAL STABILITY (M17 ST 1204)

UNIT-I

Beam columns: Differential equation for beam columns – Beams column with concentrated loads – continuous lateral load– couples –Beam column with built in ends– continuousbeams with axial load – application of Trigonometric series – Determination of allowable stresses.

UNIT-II

Elastic buckling of bars: Elastic buckling of straight columns – Effect of shear stress on buckling – Eccentrically and laterally loaded columns –Sway & Non Sway mode - Energy methods – Buckling of a bar on elastic foundation – Buckling of bar with intermediate compressive forces and distributed axial loads – Buckling of bars with change in cross section– Effect of shear force on critical load – Built up columns– Effect of Initial curvature on bars – Buckling of frames – Sway & Non Sway mode.

UNIT-III

In-elastic buckling: Buckling of straight bars – Double modulus theory Tangent modulus theory. Experiments and design formulae: Experiments on columns – Critical stress diagram –Empirical formulae of design – various end conditions – Design of columns based onbuckling. Mathematical Treatment of stability problems: Buckling problem orthogonality relation – Ritz method –Stiffness method and formulation of Geometric stiffness matrix-Applications to simple frames.

UNIT-IV

Torsional Buckling: Pure torsion of thin walled bars of open cross section – Non uniform torsion of thin walled bars of open cross section - Torsional buckling – Buckling of Torsion and Flexure.

UNIT-V

Lateral Buckling of simply supported Beams: Beams of rectangular cross section subjected for pure bending, Buckling of I Section subjected to pure bending.

Course Outcomes for First Year Second Semester Course	
Course Code: M17ST 1204	
Course Title:Structural Stability	
CO-1	Analyze structures with linear and nonlinear behaviour.
CO-2	Gain the knowledge on Stability of Continuous systems.
CO-3	Distinguish elastic buckling and in elastic buckling.

SYLLABUS: RELIABILITY ANALYSIS AND DESIGN (M17 ST 1205)

(ELECTIVE–III)

UNIT-I

Concepts of Structural Safety: General, Design methods. Basic Statistics: Introduction, Data reduction, Histograms, Sample correlation. Probability Theory: Introduction, Random events, Random variables, Functions of random variables, Moments and expectation, Common probability distribution, Extremal distribution.

UNIT-II

Resistance Distributions and Parameters: Introduction, Statistics of properties of concrete, Statistics of properties of steel, Statistics of strength of bricks and mortar, Dimensional variations, Characterization of variables, Allowable stresses based on specified reliability.

UNIT-III

Probabilistic Analysis of Loads: Gravity loads, Wind load. Basic Structural Reliability: Introduction, Computation of structural reliability. Monte Carlo Study of Structural Safety: General, Monte Carlo method, Applications.

UNIT-IV

Level 2 Reliability Methods: Introduction, Basic variables and failure surface, First-order second-moment methods (FOSM)

UNIT-V

Reliability Based Design: Introduction, Determination of partial safety factors, Safety checking formats, Development of reliability based design criteria, Optimal safety factors, Summary of results of study for Indian standard – RCC design. Reliability of Structural Systems: Preliminary concepts as applied to simple structures.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 ST 1205	
Course Title:Reliability Analysis and Design	
CO-1	Understand the importance of reliability in Civil engineering.
CO-2	Apply the concepts of computation of structural reliability for solving engineering problems.
CO-3	Gain the knowledge of reliability based structural design.

SYLLABUS: PRESTRESSED CONCRETE (M17 ST 1206)

(ELECTIVE–III)

UNIT-I

General principles of Pre-stressing- Pre-tensioning and Post tensioning - Pre tensioning and Post tensioning methods- Different systems of Pre-stressing- Analysis of prestress and Bending stresses– Resultant– stress at a section – pressure line – concept of load balancing – stresses in tendons.

UNIT-II

Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Long term losses

UNIT-III

Flexural, shear; torsional resistance and design of Prestressed concrete section. Types of flexural failure – code procedures-shear and principal stresses – Prestressed concrete members in torsion – Design of sections for flexure, Axial Tension, Compression and bending, shear, Bond

UNIT-IV

Analysis of continuous beams –Elastic theory- Linear transformation and Concordant tendons Deflections of pre-stressed concrete beams: Importance of control of deflections- factors influencing deflections-short term deflections of un-cracked member – prediction of long term deflections

UNIT-V

Analysis of end blocks: By Guyon"s method and Magnel"s method, Anchorage zone stresses Approximate method of design- anchorage zone reinforcement- transfer of pre stresses- pre tensioned members-Composite sections: Introduction-Analysis for stresses- differential shrinkage- general design considerations

Course Outcomes for First Year Second Semester Course	
Course Code:M17 ST 1206	
Course Title:Pre-stressed Concrete	
CO-1	Analyze and design pre-stressed concrete members.
CO-2	Gain the knowledge on materials, pre-stressing Systems, end anchorages.
CO-3	Gain the knowledge on losses of pre-stress.
CO-4	Analyze and design of sections for flexure.

SYLLABUS: OPTIMIZATION TECHNIQUES (M17 ST 1207)

(ELECTIVE–III)

UNIT-I

Introduction: Need and scope for optimization – statements of optimization problems-Objectivefunction and its surface design variables- constraints and constraint surface-Classification ofoptimization problems (various functions continuous, discontinuous and discrete) and function behavior (monotonic and unimodal)

UNIT-II

Classical optimization techniques: Differential calculus method, multi variable optimization by method of constrained variation and Lagrange multipliers (generalized problem) Khun-Tucker conditions of optimality - Fully stressed design and optimality criterion based algorithms introduction, characteristics of fully stressed design theoretical basis-examples

UNIT-III

Non-Liner programming: Unconstrained minimization- Fibonacci, golden search, Quadratic and cubic interpolation methods for a one dimensional minimization and univariate method, Powel"s method, Newton"s method and Davidon Fletcher Powell"s method for multivariable optimization- Constrained minimization-Cutting plane method- Zoutendjik"s method- penalty function methods

UNIT-IV

Linear programming: Definitions and theorems- Simplex method-Duality in Linear programming-Plastic analysis and Minimum weight design and rigid frame

UNIT-V

Introduction to quadratic programming: Geometric programming- and dynamic programming Design of beams and frames using dynamic programming technique

Course Outcomes for First Year Second Semester Course	
Course Code: M17 ST 1207	
Course Title:Optimization Techniques	
CO-1	Derive optimized structure using classical and modern methods of optimization.
CO-2	Gain the knowledge on Formulation of Structural Optimization problems.
CO-3	Gain the knowledge on the concept of classical methods of optimization for multivariable
CO-4	With equality or inequality constraints: solution by method of Lagrange Multiplier – Applications in structural engineering, Kuhn-Tucker conditions.

SYLLABUS: INDUSTRIAL STRUCTURES (M17 ST 1208)
(ELECTIVE–IV)

UNIT-I

Planning and functional requirements- classification of industries and industrial structures planning for layout-requirements regarding lighting ventilation and fire safety- protection against noise and vibrations

UNIT-II

Industrial buildings- roofs for industrial buildings (Steel) - design of gantry girder

UNIT-III

Design of Folded plates- Design considerations- analysis of folded plates- analysis of multi bay folded plates-design of diaphragm beam

UNIT-IV

Power plant structures- Bunkers and silos- chimney and cooling towers-Nuclear containment structures. Power transmission structures- transmission line towers- tower foundations- testing tower

UNIT-V

Light gauge steel structures: Local buckling of thin sections, Post packing of thin elements, Light gaugesteel columns and compression members, Form factor for columns and compression members, Stiffenedcompression elements,Multiple stiffened compression elements, Unstiffened compression elementseffective length of light gauge steel compression members, Basic design stress, Allowable design stress,Light gauge steel beams, Laterally supported light gauge steel beams web crippling. Allowable designstressin beams, Beams subjected to combinedaxial end bendingstress, connections

Course Outcomes for First Year Second Semester Course	
Course Code: M17 ST 1208	
Course Title: Industrial Structures	
CO-1	Know the requirements of various industries.
CO-2	Design the roofs and Gantry girder for Industrial buildings.
CO-3	Design the Folded plates and Bunkers and silos.
CO-4	Design the Chimneys, cooling towers and Transmission of towers.

SYLLABUS: BRIDGE ENGINEERING (M17 ST 1209)

(ELECTIVE–IV)

UNIT-I

Masonry arch Bridge design details- Rise, radius, and thickness of arch- Arch ring-Dimensioning of sub structures- Abutments pier and end connections.(Ref: IRC- SP-13)

UNIT-II

Super Structure: Slab bridge- Wheel load on slab- effective width method- slabs supported on twoedges- cantilever slabs- dispersion length- Design of interior panel of slab- Pigeaud"s method- design of longitudinal girders- Guyon-Messonet method- Hendry Jaegar method-Courbon"s theory. (Ref: IRC-21),voided slabs, T-Beam bridges.

UNIT-III

Plate girder bridges- Elements of plate girder and their design-web-flange- intermediate stiffenervertical stiffeners- bearing stiffener-design problem

UNIT-IV

Prestressed Concrete and Composite bridges- Preliminary dimensions-flexural and torsional parameters- Courbon"s Theory – Distribution coefficients by exact analysis- design of girder section- maximum and minimum prestressing forces- eccentricity- live load and dead load shear forces- cable zone in girder-check for stresses at various sections- check for diagonal tension- diaphragms and end block design- shorttermandlongtermdeflections-Compositeactionofcompositebrides-shearconnectors-compositeor transformed section-design problem. (Ref:IRC: Section-VI)

UNIT-V

Sub structure- Abutments- Stability analysis of abutments- piers- loads on piers – Analysis of piers-Design problem(Ref: IRC-13, IRC-21, IRC-78)- Pipe culvert- Flow pattern in pipe culvers- culvertalignment- culvertentrancestructure-Hydraulicdesignandstructuraldesignofpipeculverts-reinforcementsin pipes .(Ref:IRC: SP-13)

Course Outcomes for First Year Second Semester Course	
Course Code: M17 ST 1209	
Course Title:Bridge Engineering	
CO-1	Apply the IS code of practice for the design of steel bridges.
CO-2	Analyze and design of Plate girder Bridges.

SYLLABUS: EARTH RETAINING STRUCTURES (M17 ST 1210)

(ELECTIVE–IV)

UNIT-I

Earth pressures – Different types and their coefficients- Classical Theories of Earth pressure – Rankine"s and Coulomb"s Theories for Active and Passive earth pressure- Computation of Lateral Earth Pressure in Homogeneous and Layered soils- Graphical solutions for Coulomb"s Theory in active and passive conditions..

UNIT-II

Retaining walls – different types - Type of Failures of Retaining Walls– Stability requirements– Drainagebehind Retainingwalls– Provision of Joints– Relief Shells.

UNIT-III

Sheet Pile Structures – Types of Sheet piles – Cantilever sheet piles in sands and clays – Anchored sheetpiles – Free earth and Fixed earth support methods – Row"s moment reduction method – Location ofanchors, Forces in anchors.

UNIT-IV

Soil reinforcement – Reinforced earth - Different components – their functions – Mechanics of reinforced earth – Failure modes-Failure theories – Design of Embankments on problematic soils.

UNIT-V

Braced cuts and Cofferdams: Lateral Pressure in Braced cuts – Design of Various Components of a Braced cut – Stability of Braced cuts – Bottom Heave in cuts. – types of cofferdam, suitability, merits and demerits – Design of single – wall cofferdams and their stability aspects– TVA method and Cummins" methods

Course Outcomes for First Year Second Semester Course	
Course Code: M17 ST 1210	
Course Title: Earth Retaining Structures	
CO-1	Design the different types of Retaining walls and sheet piles using earth pressure theories.
CO-2	Design the reinforced earth structures, Braced cuts and cofferdams.

SYLLABUS: COMPUTER APPLICATIONS IN STRUCTURAL ENGINEERING LAB (M17 ST 1211)

Analysis and Design using STADD, STRAP, STRUDS, ANSYS

1. Programming for beams subject to different loading (mandatory).
2. Analysis of reinforced concrete multi storied building
3. Analysis of steel transmission line tower
4. Analysis of plane and space truss
5. Analysis of plane and space frame
6. Determination of mode shapes and frequencies of tall buildings using lumped mass (stick model) approximation
7. Wind analysis on tall structure
8. Analysis of prestressed concrete bridge girder
9. Analysis of Cylindrical shell
10. Modal Analysis of a Cantilever Beam

NOTE: A minimum of eight (including item1) from the above set have to be conducted.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 ST 1211	
Course Title:Computer applications in structural Engineering Lab	
CO-1	Analyze the structural elements using software designs.
CO-2	Design the structures fir the dynamic loads using of tware's.
CO-3	Solve the finite elements application problems of structural engineering by software's.

Regulation: R17			M.Tech. III - Semester			
CIVIL ENGINEERING(STRUCTURAL ENGINEERING) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
CodeNo	**CourseTitle**	**Scheme of Examination**	**C**	**Int.**	**Ext.**	**Total**
M17ST2101	Comprehensive Viva-Voce	Viva-Voce	2	50	---	50
M17ST 2102	Seminar-I	OralPresentation	2	50	---	50
M17ST2103	Project Work Part-I	Review	16	50	---	50
		Total	**20**	**150**	**---**	**150**

1. The Viva-Voce for the Comprehensive Viva-Voce and Seminar-I shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. Candidates can do their Project Work Part-I&II work within the department or in any industry/research organization for two semesters (i.e. 3rd and 4th semesters). In case of thesis done in an industry/research organization, one advisor (Guide) should be from the department and one advisor (Co-Guide) should be from the industry/research organization.

3. The Project Work Part-I should be submitted at the end of 3rd Semester and it will be evaluated through Review by a committee consisting of Head of the Department, PG coordinator and Project guide. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

Regulation: R17			**M.Tech. IV - Semester**			
CIVIL ENGINEERING(STRUCTURAL ENGINEERING) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
CodeNo	**Course Title**	**Scheme of Examination**	**C**	**Int.**	**Ext.**	**Total**
M17ST2201	Seminar-II	Oralpresentation	2	50	-	50
M17ST2202	Project Work Part-II	Viva-voce	18	-	100	100
		Total	**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20,20and 20 Marks by the members respectively

COMPUTER SCIENCE AND ENGINEERING

Regulation: R17					M.Tech. I - Semester				
COMPUTER SCIENCE & ENGINEERING(COMPUTER SCIENCE & TECHNOLOGY) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of theSubject**	**C**	**Cr**	**L**	**T**	**Lab hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17 CST1101	Advanced Data structures and Algorithm Analysis	ES	3	3	1	--	30	70	100
M17 CST1102	Mathematical Foundations of Computer Science	ES	3	3	1	--	30	70	100
M17 CST1103	Computer Organization and Architecture	ES	3	3	1	--	30	70	100
M17 CST1104	Database Management Systems	ES	3	3	1	--	30	70	100
M17 CST1105	Advanced Operating Systems	ES	3	3	1	--	30	70	100
M17 CST1106	Data Warehousing and Data Mining	ES	3	3	1	--	30	70	100
M17 CST1107	CSTLAB-1	ES	2	--	--	3	50	50	100
M17 CST1108	CSTLAB-2	ES	--	--	--	3	--	--	--
Total			**20**	**18**	**6**	**6**	**230**	**470**	**700**

COMPUTER SCIENCE & ENGINEERING (COMPUTER SCIENCE & TECHNOLOGY)

SYLLABUS: ADVANCEDDATA STRUCTURES ANDALGORITHM ANALYSIS

(M17 CST 1101)

UNIT-I:

Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists-Algorithms.Stacksand Queues: AlgorithmImplementation usingLinkedLists.

UNIT-II:

Searching-Linear and Binary Search Methods Sorting-Bubble Sort, Selection Sort, Insertion Sort, QuickSort, Merge Sort. Trees- Binary trees, Properties, Representation and Traversals (DFT, BFT), ExpressionTrees(Infix,prefix,postfix).Graphs-BasicConcepts, StorageStructures andTraversals.

UNIT-III:

Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions,CollisionResolution-SeparateChaining, OpenAddressing-Linear Probing,DoubleHashing.

UNIT-IV:

Priority queues- Definition, ADT, Realizing a Priority Queue Using Heaps, Definition, Insertion, Deletion, Search Trees- Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion, Deletion.

UNIT–V:

Search Trees- AVL Trees, Definition, Height of AVL Tree, Operations, Insertion, Deletion and Searching. Search Trees- Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

Course Outcomes for First Year First Semester Course	
Course Code: M17CST 1101	
Course Title:ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS	
CO-1	Could be able to write programs and class libraries given a specification.
CO-2	Implement various data structures.
CO-3	Implement and analyze various sorting algorithms.
CO-4	Understand abstract data types.
CO-5	Know how they are implemented in C++ programming language

SYLLABUS: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (M17 CST 1102)

UNIT-I:

Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

UNIT-II:

Set theory & Relations: Introduction, Relations and ordering, Properties of binary Relations, Equivalence,Compatibility Relations, Partial ordering, Hasse diagram. Functions: composition of functions, Inverse

Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and Monoids,groups,sub groups,Definitions,Examples,homomorphism,Isomorphismandrelatedproblems.

UNIT-III:

ElementaryCombinatorics:Basisofcounting,EnumerationofCombinations&Permutations,Enumerating of Combinations& Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion–Exclusion.

UNIT-IV:

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT-V:

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees,Planar Graphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multigraphsand Euler circuits,Hamiltoniangraphs, Chromatic Numbers

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1102	
Course Title:MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	
CO-1	Critical, logical-mathematical reasoning
CO-2	Ability to apply mathematical knowledge and logic in solving problems
CO-3	Students develops the ability to illustrate basic terminology of functions, relations and demonstrate knowledge of their associated operations.
CO-4	Able to demonstrate practical applications and use of basic counting principles of permutations and combinations
CO-5	Able to represent and apply theory in solving computer science applications

SYLLABUS: COMPUTERORGANIZATION ANDARCHITECTURE (M17CST1103)

UNIT – I

Number System and Computer Arithmetic Signed and Unsigned Numbers, Additional and Subtraction,Multiplication, Division, Floating Point Representation Logical operations, Gray Code, BCD Code, ErrorDetectingCode,BooleanAlgebra, Simplification ofBooleanExpressions –Maps.

UNIT – II

Combinational and Sequential Circuits, Decoders, Encoders, Multiplexers, Half and Full adders, ShiftRegisters, Flip-Flops,BinaryCounters, MemoryUnit.

UNIT -III

MemoryOrganization,MemoryHierarchy,MainMemory,AuxilaryMemory,AssociativeMemory,CacheMemory VirtualMemoryconcept.

UNIT – IV

Arithmetic and Logic Unit Design, Addition and Subtraction, Sign and Unsigned Numbers, MultiplicationandDivision algorithms,BCD adders.

UNIT – V

Input – Output organization peripheral Devices, Input – Output Interface, Asynchronous data transfer,ModesofTransfer,PriorityInterrupts, DMA,Input–Output Processor, SerialCommunication.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1103	
Course Title:COMPUTER ORGANIZATION AND ARCHITECTURE	
CO-1	Apply the basic knowledge about Different Number Systems, Digital logic to the Functional components of computer.
CO-2	Students will be able to Describe the major components of a computer.
CO-3	Students will be able to classify different Computer Instructions.
CO-4	Students will be able to Describe Instruction set architecture.
CO-5	Recognize the importance of peripheral devices
CO-6	Students should be able to classify Computer memories

SYLLABUS: DATA BASE MANAGEMENT SYSTEMS (M17 CST1104)

UNIT-I:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Database Systems. Introduction to Database design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views–Destroying/altering Tables and Views

UNIT-II:

Relational Algebra and Calculus: Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus. Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Databases.

UNIT-III:

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss-less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Database Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies..

UNIT-IV:

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, ConcurrentExecution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking –Transaction Support in SQL. Concurrency Control: Serializability, and recoverability – Introduction toLock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking. Crash recovery: Introduction to Crash recovery, Introduction toARIES, the Log , Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing,recoveringfrom aSystem Crash, Mediarecovery

UNIT-V:

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations. Storing data: Disks and Files: The Memory Hierarchy – Redundant Arrays of Independent Disks. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

Course Outcomes for First Year First Semester Course	
Course Code: M17CST1104	
Course Title:DATABASE MANAGEMENT SYSTEMS	
CO-1	To construct SQL commands for creating database objects, populating tables, and retrieve data
CO-2	To prepare queries in formal query languages
CO-3	To explore the features of RDBMS
CO-4	To apply conceptual database design
CO-5	To apply logical database design
CO-6	To normalize the tables.
CO-7	To know different protocols of Concurrency control
CO-8	To apply Recovery techniques of DBMS
CO-9	To understand different indexing techniques

SYLLABUS:ADVANCED OPERATING SYSTEMS (M17 CST1105)

UNIT -I:

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks - communication primitives. Theoretical Foundations - inherent limitations of a distributed system - lamp ports logical clocks - vector clocks - casual ordering of messages - global state - cuts of a distributed computation - termination detection. Distributed Mutual Exclusion - introduction - the classification of mutual exclusion and associated algorithms - a comparative performance analysis.

UNIT -II:

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems - issues in deadlock detection and resolution - control organizations for distributed deadlock detection - centralized and distributed deadlock detection algorithms -hierarchical deadlock detection algorithms. Agreement protocols - introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture - mechanism for building distributed file systems - design issues - log structured file systems.

UNIT -III:

Distributed shared memory-Architecture- algorithms for implementing DSM - memory coherence and protocols - design issues. Distributed Scheduling - introduction - issues in load distributing - components of a load distributing algorithm - stability - load distributing algorithm - performance comparison - selecting a suitable load sharing algorithm - requirements for load distributing -task migration and associated issues. Failure Recovery and Fault tolerance: introduction- basic concepts - classification of failures - backward and forward error recovery, backward error recovery- recovery in concurrent systems - consistent set of check points - synchronous and asynchronous check pointing and recovery - check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT -IV:

Protection and security -preliminaries, the access matrix model and its implementations. -safety in matrix model-advanced models of protection. Data security-cryptography: Model of cryptography, conventional cryptography- modern cryptography, private key cryptography, data encryption standard-publickeycryptography-multipleencryption-authentication in distributedsystems.

UNIT -V:

Multiprocessor operating systems - basic multiprocessor system architectures - inter connection networks for multiprocessor systems - caching - hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling. Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects - introduction, database systems - a concurrency control model of database systems- the problem of concurrency control - serializability theory- distributed database systems, concurrency control algorithms - introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms - concurrency control algorithms, data replication.

Course Outcomes for First Year First Semester Course	
Course Code:M17 CST 1105	
Course Title: ADVANCED OPERATING SYSTEMS	
CO-1	To understands the concept of Distributed systems
CO-2	To understand the concepts of shared memory and process synchronization
CO-3	To handle deadlocks in distributed systems
CO-4	To understand failures and Recovery in distributed systems
CO-5	To understand File and directory structure in Distributes operating systems

SYLLABUS: DATA WAREHOUSING AND DATA MINING (M17 CST1106)

UNIT I: DATAWARE HOUSING:

Data warehousing components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools–Metadata

UNIT II:BUSINESS ANALYSIS:

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet..

UNIT III:DATA MINING:

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives –Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing..

UNIT IV:ASSOCIATION RULE MINING AND CLASSIFICATION:

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds ofAssociation Rules – Correlation Analysis – Constraint Based Association Mining – Classification andPrediction–BasicConcepts–DecisionTreeInduction–BayesianClassification–RuleBasedClassification–ClassificationbyBackpropagation–SupportVectorMachines–AssociativeClassification–LazyLearners –Other Classification Methods– Prediction.

UNIT V:CLUSTERING AND TRENDS IN DATA MINING:

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines –Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

Course Outcomes for First Year First Semester Course	
Course Code:M17 CST 1106	
Course Title:DATA WAREHOUSING AND DATA MINING	
CO-1	Extract knowledge using data mining techniques
CO-2	At the closing stage of the course, students will be able to analyse different operations and techniques involved in data mining.
CO-3	Evaluate Classification algorithms.
CO-4	Evaluate Clustering algorithms
CO-5	Describe Multidimensional data model and data mining primitive.

SYLLABUS:CST LAB-1(M17 CST1107)

DataStructuresPrograms:

1. To implement Stacks & Queues using Arrays & Linked Lists
2. To implement Stack ADT, Queue ADT using arrays &Linked Lists
3. To implement Dequeue using Double Linked List& Arrays
4. Toperformvarious Recursive&Non-recursiveoperations onBinarySearchTree
5. ToimplementBFS &DFS foragraph
6. ToimplementMerge &Heap sortof givenelements
7. Toperformvariousoperations onAVLtrees
8. To implement Krushkal‟s algorithm to generate a min-costs panning tree
9. To implement Prim‟s algorithm to generate min-costs panning tree.
10. To implement functions of DictionaryusingHashing

Operatingsystemprograms:

1. Program to implement FCFS (First Come Firs Serve)scheduling Algorithms
2. Program to implement SJF(Shortest Job First) Scheduling Algorithm
3. Program to implement Priority Scheduling algorithm
4. Program to implement Round Robin Scheduling algorithm
5. Program to implement FIFO(First In First Out)Page Replacement Algorithm
6. Program to implement LRU(least Recently used)Page Replacement Algorithm
7. Program to implement LFU(Least Frequently used)Page Replacement Algorithm
8. Write a program to implement how Disk Scheduling is done in operating system
9. Draw the appropriate C.P.U performance graphs for SJF Scheduling Algorithm

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1107	
Course Title:Advanced Data structures and Algorithm Analysis Lab	
CO-1	Implement Linear data structures
CO-2	Non-linear data structures
CO-3	Sorting techniques Design of various projections
CO-4	Use of an operating system to develop software
CO-5	Write software systems based on multiple cooperating processes or threads
CO-6	Implement file organization techniques
CO-7	Implement file allocation strategies
CO-8	Implement process scheduling & synchronization algorithms
CO-9	Implement memory management scheme like best fit, worse fit etc.

SYLLABUS:CST LAB-2(M17 CST1108)

ListofExperiments:

1. SQL commands (DDL, DML and DCL)
2. Functions and Procedures
3. Triggers, views and sequences
4. Practice to create Forms
5. PracticetocreateReports
6. Implement aMiniProject
   - A. Writeproblemstatement
   - B. DrawERdiagrams
   - C. ConverttoTables
   - D. Normalization
   - E. Insertappropriatedata
   - F. Securitydesign
   - G. Forms
   - H. Reports

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1108	
Course Title:DATABASE MANAGEMENT SYSTEMS lab	
CO-1	To create tables and views.
CO-2	To execute SQL queries
CO-3	To modify the data and structure of tables and views.
CO-4	To apply triggers for data modification events
CO-5	To create procedures and functions using PL/SQL.
CO-6	To design a database mini-project.
CO-7	To implement a mini-project

Regulation: R17					M.Tech. II - Semester				
COMPUTER SCIENCE & ENGINEERING(COMPUTER SCIENCE & TECHNOLOGY) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**T**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17CST1201	Cyber Security	ES	3	3	1	--	30	70	100
M17CST1202	Computer Networks	ES	3	3	1	--	30	70	100
M17CST1203	Big Data Analytics	ES	3	3	1	--	30	70	100
M17CST1204	Machine Learning	ES	3	3	1	--	30	70	100
#ELE-1	Elective-I	ES	3	3	1	--	30	70	100
#ELE-2	Elective-II	ES	3	3	1	--	30	70	100
M17CST1213	CST LAB3	ES	2	--	--	3	50	50	100
*M17CST1214	CST LAB4	ES	--	--	--	3	--	--	--
Total			**20**	**18**	**6**	**6**	**230**	**470**	**700**

	CourseCode	Course
#ELE-1	M17CST1205	SoftwareEngineering
	M17CST1206	ArtificialIntelligence
	M17CST1207	CompilerDesign
	M17CST1208	EmbeddedSystems
#ELE-2	M17CST1209	ImageProcessing
	M17CST1210	ParallelAlgorithms
	M17CST1211	Cloud Computing
	M17CST1212	MobileComputing

SYLLABUS: CYBER SECURITY (M17 CST1201)

UNIT I:

Introduction:

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNITII:

Conventional Encryption: Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC

UNITIII:

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat"s and Euler"s Theorems, The Chinese Remainder theorem, Discrete logarithms Public key: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNITIV:

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction(SET) Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

UNITV:

Intrusion Detection: Intruders, Intrusion Detection systems, Password Management. Malicious Software: Viruses and related threats & Countermeasures. Fire walls: Firewall Design principles, Trusted Systems

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1201	
Course Title: CYBER SECURITY	
CO-1	Able to understand the basic concepts and goals of Information security
CO-2	Able to examine different classical cryptosystems.
CO-3	Able to understand the ideas of public key cryptosystems and digital signature schemes.
CO-4	Able to examine different network security protocols.
CO-5	Able to understand access control and authentication mechanisms.
CO-6	Able to understand appropriate procedures required to secure networks.

SYLLABUS:COMPUTER NETWORKS (M17 CST1202)

UNIT – I

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT – II

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols

UNIT – III

The Data LinkLayer - Services Provided to the Network Layer– Framing – Error Control – FlowControl, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, ElementaryData Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One BitSlidingWindow Protocol-A ProtocolUsingGo-Back-N-AProtocol Using SelectiveRepeat

UNIT – IV

The Medium Access Control Sub layer-The Channel Allocation Problem-Static Channel Allocation Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Access Protocols-Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sub layer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless LANs-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sub layer Protocol-The 805.11 Frame Structure-Services

UNIT – V

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality Principle-Shortest Path Algorithm, Congestion Control Algorithms Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1202	
Course Title: COMPUTER NETWORKS	
CO-1	Independently understand basic computer network technology.
CO-2	Identify the different types of network topologies and protocols.
CO-3	Explain various transmission media and implement various multiplexing techniques.
CO-4	Implement various Link layer protocols like flow control and error control.
CO-5	Implement various medium access control mechanisms and protocols
CO-6	Understand Wireless LAN protocols and architectures
CO-7	Implement Network layer design issues like switching mechanisms, routing and traffic management.

SYLLABUS: BIG DATA ANALYTICS (M17 CST1203)

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XMLfiles.

UNIT-III

Writing Map Reduce Programs: A Weather Dataset, Understanding Hadoop API for Ma pReduce Framework (Old and New), Basic programs of Hadoop Map Reduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparatorS

UNIT-V

Pig: Hadoop Programming Made Easier: Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Da

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1203	
Course Title:BIGDATA ANALYTICS	
CO-1	Implement data structures and map reduce paradigm using java
CO-2	Configure Hadoop distributed file system
CO-3	Understand Hadoop I/O
CO-4	Write scripts using PIG and run them in local and distributed modes
CO-5	Apply structure to Hadoop data with HIVE

SYLLABUS:MACHINE LEARNING (M17 CST1204)

UNIT -I: The ingredients of machine learning, Tasks: the problems that can be solved with machinelearning, Models: the output of machine learning, Features, the workhorses of machine learning. **Binary classification and related tasks:** Classification, Scoring and ranking, Class probability estimation

UNIT- II: Beyond binary classification: Handling more than two classes, Regression, Unsupervisedand descriptive learning. **Concept learning**: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT- III: Tree models: Decision trees, Ranking and probability estimation trees, Tree learning asvariance reduction. **Rule models:** Learning ordered rule lists, Learning unordered rule sets, Descriptiverulelearning,First-orderrulelearning

UNIT -IV: Linear models: The least-squares method, The perceptron: heuristic learning algorithmfor linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Goingbeyond linearity with kernel methods. **Distance Based Models:** Introduction, Neighbors and exemplars,NearestNeighborsclassification, Distance BasedClustering,HierarchicalClustering.

UNIT-V: Probabilistic models: Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimizing conditional likelihood Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1204	
Course Title: MACHINE LEARNING	
CO-1	The student will be able understand the two main areas of Machine Learning i.e. Supervised and unsupervised learning
CO-2	To understand main models and algorithms for Regression, Classification particularly beyond binary classification
CO-3	To understand variety of learning algorithms
CO-4	To evaluate and compare the performance of learning algorithms
CO-5	To understand support vector machine.

SYLLABUS: SOFTWARE ENGINEERING (M17 CST1205)
(ELECTIVE-I)

UNIT-I:

Software and Software Engineering: The Nature of Software, The Unique Nature of Web Apps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process

UNIT-II:

Requirements Analysis and Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification. Software Design: Overview of the Design Process, How to Characterize of a Design? Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design

UNIT – III:

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, over view of Object Oriented design. User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

UNIT – IV:

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing

UNIT –V:

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model. Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment

Course Outcomes for First Year First Semester Course	
Course Code:M17 CST 1205	
Course Title:SOFTWARE ENGINEERING (E-1)	
CO-1	Understand the nature of software and various software process models
CO-2	Gather, analyse and Specify Software Requirements for any system
CO-3	Design various aspects of the system like System design, Database design, User Interface design etc., by following Structural Design of Object Oriented Design
CO-4	Apply various Software testing techniques to increase the reliability of the system
CO-5	Understand various Software Quality Management Techniques
CO-6	Use various Computer Aided Software Engineering (CASE) Tools.

SYLLABUS: ARTIFICIAL INTELLIGENCE (M17 CST1206)
(ELECTIVE-I)

UNIT-I:

Introduction to artificial intelligence: Introduction, history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI

UNIT-II:

Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

UNIT-III:

Logic concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

UNIT-IV:

Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames advanced knowledge representation techniques: Introduction, conceptual dependency theory, script structure, cyc theory, case grammars, semantic web.

UNIT-V:

Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

Course Outcomes for First Year First Semester Course	
Course Code:M17 CST 1206	
Course Title:ARTIFICIAL INTELLIGENCE (E-1)	
CO-1	Able to learn artificial intelligence techniques
CO-2	Understand the concept of knowledge representation
CO-3	Able to apply logic concepts to ascertain facts
CO-4	Able to apply heuristic search methods in reaching the goal
CO-5	Able to solve problems using advanced knowledge representation methods
CO-6	Able to understand expert systems

COMPILER DESIGN (M17 CST1207)
(ELECTIVE-I)

UNIT – I

Introduction Language Processing, Structure of a compiler the evaluation of Programming language, The Science of building a Compiler application of Compiler Technology Programming Language Basics. Lexical Analysis-: The role of lexical analysis buffing, specification of tokens. Recognitions of tokens the lexical analyzer generator lexical

UNIT –II

Syntax Analysis: The Role of a parser, Context free Grammars Writing A grammar, top down parsingbottom up parsing, ,Shift Reduce parser, Operator Precedence Parser, Predictive Parser, Introduction toLR Parser.

UNIT–III

More Powerful LR parser (SLR, CLR, LALR), Using Armigers Grammars Equal Recovery in Lr parser, Syntax Directed Transactions Definition, Evolution order of SDTS Application of SDTS. Syntax Directed Translation Schemes.

UNIT – IV

Intermediated Code: Generation Variants of Syntax trees 3 Address code Quadruples, Triples and IndirectTriples, Types and Deceleration, Translation of Expressions, Type Checking, code optimization, Theprinciplesources ofoptimization, Loop Optimization,DAG, Global dataflow analysis.

UNIT – V

Code Generation: A simple code generator, Register allocation and assignment, Code generation fromDAG, Peep hole optimization, Symbol table, Activation Record, Runtime Environments, Stack allocation of space, access to Non Local date on the stack Heap Management code generation

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1207	
Course Title:COMPILER DESIGN (E-1)	
CO-1	To acquire the knowledge of modern compiler & its features
CO-2	To use the knowledge of patterns, tokens & regular expressions
CO-3	To learn the new code optimization techniques to improve the performance of a program in terms of speed & space
CO-4	Able to design and implement parsers
CO-5	Able to compile simple C programs using their own designed compiler

SYLLABUS: EMBEDDED SYSTEMS (M17 CST1208)

(ELECTIVE-I)

UNIT I:

Examples of Embedded Systems – Typical Hardware – Memory – Microprocessors – Busses – Direct Memory Access – Introduction to 8051 Microcontroller – Architecture-Instruction set – Programming-MicroprocessorArchitecture –InterruptBasics–TheShared-Dataproblem –InterruptLatency.

UNIT II:

Round–Robin Architecture - Round–Robin with Interrupts Architecture - Function-Queue- Scheduling Architecture– Real-Time Operating Systems Architecture– Selection of Architecture.

UNIT III:

Tasks and Task States – Tasks and Data – Semaphores and Shared Data – Semaphore Problems –Semaphore variants, Message Queues – Mailboxes – Pipes – Timer Functions – Events – MemoryManagement–InterruptRoutines in RTOSEnvironment.

UNIT IV:

RTOS design – Principles – Encapsulation Semaphores and Queues – Hard Real-Time Scheduling Considerations – Saving Memory Space – Saving Power.

UNIT V:

Host and Target Machines – Linker/Locator for Embedded Software- Getting Embedded Software into theTarget System, Testing on your Host Machine – Instruction Set Simulators – Laboratory Tools used forDebugging.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1208	
Course Title:EMBEDDED SYSTEMS (E-1)	
CO-1	To describe the differences between general computing system and Embedded System.
CO-2	To recognize the classification of Embedded System.
CO-3	To understand various architectures of Embedded System
CO-4	To design Real Time Embedded System using the concepts of RTOS.
CO-5	To load embedded software on Host machine.
CO-6	To test Host machine.

SYLLABUS: IMAGE PROCESSING (M17 CST 1209)
(ELECTIVE-II)

UNITI:

Introduction: Digital Image representation, fundamentals steps in Digital Image Processing, Applications of Computer graphics and Image Processing, Fundamentals on Pixel concepts,,

UNITII:

Transformations: Translations, Scaling, rotation, reflection and shear transformations, Homogeneous coordinates, **Composite Transformations-** Reflection about an arbitrary line; Windowing and clipping, viewing transformations, Cohen- Sutherland clipping algorithm

UNITIII:

Digital Image Properties: Metric and topological properties of Digital Images, Histogram, entropy, Visual Perception, Image Quality, Color perceived by humans, Color Spaces, Palette Images, color Constancy Color Images: Pixel brightness transformations, Local Preprocessing, image smoothing, Edge detectors, Robert Operators, Laplace, Prewitt, Sobel, Fri-chen, Canny Edge detection

UNIT IV:

Mathematical Morphology: Basic Mathematical Concepts, Binary dilation and Erosion, Opening and closing, Gray Scale dilation and erosion, Skeleton, Thinning, Thickening Ultimate erosion, Geodesic transformations, Morphology and reconstruction, Morphological Segmentation

UNIT V:

SEGMENTATION: Threshold detection methods, Optimal Thresholding, Edge based Segmentation Edge image thresholding, Edge relaxation, Border tracing, Hough Transforms, Region based segmentation: Region Merging Region Splitting, Splitting and Merging, Watershed Segmentation. **Image Data Compression**: Image data Properties, Discrete Image Transformations in data compression, Discrete Cosine and Wavelet Transforms, Types of DWT and merits; Predicative Compression methods, Hierarchical and Progressive Compression methods, Comparison of Compression methods, JPEGMPEG Image Compression methods.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1209	
Course Title:IMAGE PROCESSING (E-2)	
CO-1	Demonstrated understanding of the basic concepts of two-dimensional signal acquisition, sampling, and quantization
CO-2	Demonstrated understanding of spatial filtering techniques, including linear and nonlinear methods.
CO-3	Demonstrated understanding of 2D Fourier transform concepts, including the 2D DFT and FFT
CO-4	Uses of Fourier transform in frequency domain filtering.
CO-5	Demonstrated understanding of the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.

SYLLABUS: PARALLEL ALGORITHMS (M17 CST1210)

(ELECTIVE-II)

UNIT I: Introduction:

Computational demand in various application areas, advent of parallel processing, terminology pipelining, Data parallelism and control parallelism-Amdahl"s law.

UNIT II: Scheduling:

Organizational features of Processor Arrays, Multi processors and multi-computers. Mapping and scheduling aspects of algorithms. Mapping into meshes and hyper cubes-Load balancing-List scheduling algorithm Coffman-graham scheduling algorithm for parallel processors.

UNIT III: Algorithms:

Elementary Parallel algorithms on SIMD and MIMD machines, Analysis of these algorithms. Matrix Multiplication algorithms on SIMD and MIMD models. Fast Fourier Transform algorithms. Implementation on Hyper cube architectures. Solving linear system of equations, parallelizing aspects of sequential methods back substitution and Tri diagonal..

UNITIV: Sorting:

Parallel sorting methods, Odd-even transposition Sorting on processor arrays, Bitonic, merge on shuffle-exchange network,2D-Mesh processor and Hypercube Processor network. Parallel Quicksort on Multi processors. Hyper Quicks ort on hypercube multi computers. Parallel search operations. Ellis algorithm and Manber and Ladner"s Algorithms for dictionary operations.

UNITV: Searching

Parallel algorithms for Graph searching, All Pairs shortest paths and minimum cost spanning tree. Parallelization aspects of combinatorial search algorithms with Focus on Branch and Bound Methods and Alpha-beta Search methods.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1210	
Course Title:PARALLEL ALGORITHMS (E-2)	
CO-1	Recall fundamental concepts of parallelism
CO-2	Design and analyze the parallel algorithms for real world problems
CO-3	Implement parallel algorithms on available parallel computer systems.
CO-4	Ability to analyse parallel algorithms for sorting and searching on different parallel architectures
CO-5	Try to utilize Multi core Architectures.

SYLLABUS: CLOUD COMPUTING (M17 CST1211)
(ELECTIVE-II)

UNIT I:

Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing **Parallel and Distributed Systems:** introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

UNIT II:

Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing.

Cloud Computing : Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

UNIT III:

Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors,virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, v Blades

Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feedback control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start timefair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

UNIT IV:

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (textbook 1), Amazon Simple Storage Service (S3)(Text book 2)

Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impactassessment,trust, OS security, Virtual machine security, Securityrisks

UNIT V:

Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book1)

Google: Google App Engine, Google Web Toolkit (TextBook2)

Micro Soft: Azure Services Platform, Windows live, Exchange Online, Share Point Services, MicrosoftDynamicsCRM (Text Book 2)

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1211	
Course Title: CLOUD COMPUTING (E-2)	
CO-1	Understanding the protocols and mechanisms that support cloud computing
CO-2	Understanding the hardware necessary for cloud computing
CO-3	Understanding Cloud Resource Virtualization
CO-4	Understanding Cloud Resource Management and Scheduling
CO-5	Understand cloud security
CO-6	Develop a novel cloud application

SYLLABUS: MOBILE COMPUTING (M17 CST1212)
(ELECTIVE-II)

UNIT-I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applicationsand Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and HandheldDevices.
GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover,Security,New Data Services, GPRS.

UNIT –II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposedterminals, Near andfarterminals), SDMA, FDMA, TDMA, CDMA, WirelessLAN/(IEEE802.11)

UNIT –III

MobileNetworkLayer:IPandMobileIPNetworkLayers,PacketDeliveryandHandoverManagement, Location Management, Registration, Tunneling and Encapsulation, Route Optimization,DHCP.

UNIT –IV

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP,OtherTransportLayer Protocols forMobile Networks.
Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process &QoS Issues.

UNIT-V

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization–Introduction, Software, and Protocols.

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , MobileAgents,ServiceDiscovery.
Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1212	
Course Title: MOBILE COMPUTING (E-2)	
CO-1	A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
CO-2	The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
CO-3	A comprehension and appreciation of the design and development of context-aware solutions for mobile devices.
CO-4	A student will be able to understand various protocols for mobile computing
CO-5	A student will be able to understand various platforms for mobile computing
CO-6	A student will be able to understand various routing algorithm

SYLLABUS: CST LAB-3(M17 CST1213)
(OBJECT ORIENTED SOFTWARE ENGINEERING LAB)

LIST OF EXPERIMENTS IN OOSE LAB:

The course is realized as a project-like assignment that can, in principle, by a team of three/four studentsworking full time. Typically, the assignments have been completed during the semester. The projectdeliverablesinclude

1. Documentation including
2. A problem statement
    i. A requirements document
    ii. A Requirements Analysis Document.
3. ASystemRequirements Specification.
4. Adesigndocument
    i. A Software Design Description and a System Design Document.
5. Atestspecification.
6. Manuals/guidesfor
    i. Users and associated help frames
    ii. Programmers
    iii. Administrators (installation instructions)
7. A project plan and schedule setting out milestones, resource usage and estimated costs.
8. A quality plan setting out quality assurance procedures
9. An implementation.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1213	
Course Title: OBJECT ORIENTED SOFTWARE ENGINEERING LAB	
CO-1	To familiarize with modern software engineering methods and tools
CO-2	To design complex software solutions.
CO-3	To implement complex software solutions.
CO-4	To test software.
CO-5	To document software
CO-6	To work as part of a software team
CO-7	To develop significant projects

SYLLABUS: CST LAB-4(M17 CST1214)

DATA ANALYTICS LAB LIST OF EXPERIMENTS:

1. Introduction to exploratory data analysis using R

Load the „iris. CSV" file and display the names and type of each column.

Find statistics such as min, max, range, mean, median, variance, standard deviation for each column of data. Generate histograms and density plots for each sepal length, sepal width, petal length, petal width. Generate box plots for each of the numerical attributes. Identify the attribute with the highest variance.

2. Study of homogeneous and heterogeneous data structures such as vector, matrix, array, list, data frame in R.

3. Introduction to regression using R

Air Velocity(cm/sec)	20,60,100,140,180,220,260,300,340,380
Evaporation Coefficient(mm2 /sec)	0.18, 0.37, 0.35, 0.78, 0.56, 0.75, 1.18, 1.36, 1.17, 1.65

Use R to perform linear regression on the given the data.

Analyze the significance of residual standard-error value, R-squared value,F-statistic. Find the correlation coefficient for this data and analyze the significance of the correlation value.

Use a Quantile-Quantile plot to determine whether the residuals are normally distributed.

Perform a log transformation on the „Air Velocity"column, perform linear regression again, and analyze all the relevant values.

4. Introduction to the Weka machine learning tool kit

Create an ARFF (Attribute-Relation File Format) file and read it in WEKA. Explore the purpose of each button under the preprocess panel after loading the ARFF file. Also, try to interpret using a different ARFF file, weather .arff, provided with WEKA.

5. Perform data preprocessing inWeka–Part1

Study **Unsupervised Attribute Filters** such as **Replace Missing Values** to replacemissing values in the given dataset, **Add** to add the new attribute Average,**Discretize** to discretize the attributes into bins. Explore **Normalize** and **Standardize** options on a dataset with numerical attributes.

6. Perform data preprocessing in Weka – Part2 Study the Unsupervised Instance Filters such as Remove Range filter to remove the last two instances, R

7. Classification using the Weka toolkit–Part1

Demonstration of classification process using id3 algorithm on categorical dataset(weather).
Demonstration of classification process using naïve Bayes algorithm on categorical dataset („vote‟).
Demonstration of classification process using Random Forest algorithm on datasets containing large number of attributes.

8. Classification using the Weka toolkit–Part 2

Demonstration of classification process using J48 algorithm on mixed type of dataset after discretizing numeric attributes.
Perform cross-validation strategy with various fold levels. Compare the accuracy of the results.

9. Performing clustering in Weka

Apply hierarchical clustering algorithm on numeric dataset and estimate cluster quality. Apply DBSCAN algorithm on numeric dataset and estimate cluster quality. Apply COBWEB clustering algorithm on categorical

Dataset and estimate cluster quality.

10. Association rule analysis in Weka

Demonstration of Association Rule Mining on supermarket dataset using A priori Algorithm. Demonstration of Association Rule Mining on supermarket dataset using FP-Growth Algorithm.

INFORMATION SECURITY LAB LIST OF EXPERIMENTS:

1. Learnto installVirtual Boxoranyother equivalentsoftwareon thehost OS.
2. Perform an experiment to grab a banner with telnet and perform the task using Netcat.
3. Perform an experiment for Port Scanning with nmap.
4. Using nmap

   i) Find Open ports on a system.

   ii) Find machines which are active.

   iii) Findtheversionof remoteOS onother systems.

   iv) Find the version of s/w installed on other system using nmap.

5. Perform an experiment on Active and Passive finger printing using XProbe2and nmap.
6. Perform an experiment to demonstrate how to sniff or router traffic by using the tool wire shark.
7. Perform wireless audit of an access point/router and decrypt WEP and WPA (softwares-net stumble roar sniff).
8. Install J Crypttool and demonstrate Asymmetric, Symmetric crypto algorithm, Hash and Digital signatures studied in theory Network Security and Management.
9. DemonstrateIntrusionDetectionSystem(IDS)usingtoolSnort.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CST 1214	
Course Title: Big Data Analytics lab	
CO-1	Able to install Virtual Box or any other equivalent software on the host OS.
CO-2	Able to use tool NMAP for information gathering.
CO-3	Conduct-network based attacks on networking infrastructure (Routing, Firewalls) using WIreshark.
CO-4	Conduct attacks on wireless networks.
CO-5	Install and configure intrusion detection systems.
CO-6	Able to use R in various applications
CO-7	Performing data preprocessing using Weka
CO-8	Performing classification using Weka
CO-9	Performing Clustering using Weka

Regulation: R17			**M.Tech. III - Semester**			
COMPUTER SCIENCE & ENGINEERING(COMPUTER SCIENCE & TECHNOLOGY) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
CodeNo	**Course Title**	**Scheme of Examination**	**C**	**Int.**	**Ext.**	**Total**
M17CST 2101	ComprehensiveViva-Voce	Viva-Voce	2	50	---	50
M17CST 2102	Seminar-I	OralPresentation	2	50	---	50
M17CST 2103	Project Work Part-I	Review	16	50	---	50
Total			**20**	**150**	**---**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. 2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

3. 3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20 and 20 Marks by the members respectively.

Regulation: R17			M.Tech. IV - Semester			
COMPUTER SCIENCE & ENGINEERING(COMPUTER SCIENCE & TECHNOLOGY) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
CodeNo	**Course Title**	**Scheme of Examination**	**C**	**Int.**	**Ext.**	**Total**
M17CST 2201	Seminar-II	Oral presentation	2	50	-	50
M17CST 2202	Project Work Part-II	Viva-voce	18	-	100	100
Total			**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of theDepartment. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4thsemesteris mandatory for the submission of thesis work.

3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluatedthrough Viva–Voce examination by a committee consisting of External Examiner, Head of theDepartment, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20and20 Marks bythe members respectively.

ELECTRONICS AND COMMUNICATIONS ENGINEERING

Regulation: R17	M.Tech. I - Semester

ELECTRONICS & COMMUNICATION ENGINEERING (COMMUNICATION SYSTEMS)
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION &EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

Code No.	Name of theSubject	C	Cr	L	Tutorial Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
M17CS 1101	Detection& Estimation Theory	ES	3	3	1	--	30	70	100
M17CS 1102	Digital Data Communications	ES	3	3	1	--	30	70	100
M17CS 1103	Coding Theory& Applications	ES	3	3	1	--	30	70	100
M17CS 1104	Advanced Digital Signal Processing	ES	3	3	1	--	30	70	100
#ELE-1	Elective-I	ES	3	3	1	--	30	70	100
#ELE-2	Elective-II	ES	3	3	1	--	30	70	100
M17CS 1111	Optical & Data Communications Laboratory	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	Course
#ELE-1	M17CS1105	RadarSignalProcessing
	M17CS 1106	OpticalCommunicationTechnology
	M17CS 1107	AdvancedComputerNetworks
#ELE-2	M17CS 1108	WirelessLANsandPANs
	M17CS1109	MobileComputingTechnologies
	M17CS 1110	NetworkSecurity&Cryptography

SYLLBUS: DETECTION & ESTIMATION THEORY (M17 CS 1101)

UNITI:

RandomProcesses:

Discrete Linear Models, Markov Sequences and Processes, Point Processes, and Gaussian Processes.

UNITII:

DetectionTheory:

Basic Detection Problem, Maximum A posteriori Decision Rule, Minimum Probability of Error Classifier, Bayes Decision Rule, Multiple-Class Problem (Bayes)- minimum probability error with and without equal a priori probabilities, Neyman-Pearson Classifier, General Calculation of Probability of Error, General Gaussian Problem, Composite Hypothese

UNIT–III:

LinearMinimumMean-SquareError Filtering:

Linear Minimum Mean Squared Error Estimators, Nonlinear Minimum Mean Squared Error Estimators. Innovations, Digital Wiener Filters with Stored Data, Real-time Digital Wiener Filters, Kalman Filters.

UNIT–IV:

Statistics:

Measurements, Nonparametric Estimators of Probability Distribution and Density Functions, Point Estimators of Parameters, Measures of the Quality of Estimators, Introduction to Interval Estimates, Distribution of Estimators, Tests of Hypotheses, Simple Linear Regression, Multiple Linear Regression.

UNIT–V:

EstimatingtheParametersofRandomProcessesfromData:

Tests for Stationarity and Ergodicity, Model-free Estimation, Model-based Estimation of Autocorrelation Functions, Power Special Density Functions.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1101	
Course Title:DETECTION & ESTIMATION THEORY	
CO-1	Understand the basic concepts of signal detection and estimation
CO-2	Understand different hypotheses in detection and estimation problems
CO-3	Understand the conceptual basics of detection and estimation of signals in white and non-white Gaussian noise
CO-4	Understand the detection of random signals
CO-5	Understand the time varying waveform detection and its estimation
CO-6	Appreciate the need for estimation techniques in Communication and Signal Processing problems and acquire expertise in Classical and Bayesian estimation techniques for parameters and signals, and Detection of signals in the presence of white Gaussian noise.
CO-7	Conduct in-depth analysis of estimation problems and apply suitable estimation and detection techniques that meet the constraints of the problem such as performance, bandwidth and power overheads and computational complexity.

SYLLABUS: DIGITAL DATA COMMUNICATIONS (M17 CS 1102)

UNIT-I:

Digital Modulation Schemes:

BPSK, QPSK, 8PSK, 16PSK, 8QAM, 16QAM, DPSK – Methods, Band Width Efficiency,CarrierRecovery, ClockRecovery.

UNIT-II:

Basic Concepts of Data Communications, Interfaces and Modems:

Data Communication Networks, Protocols and Standards, UART, USB, Line Configuration,Topology, TransmissionModes, DigitalData Transmission, DTE-DCE interface, CategoriesofNetworks – TCP/IP Protocolsuite and Comparison withOSImodel.

UNIT-III:

Error Correction: Types of Errors, Vertical Redundancy Check (VRC), LRC, CRC, Checksum, Error Correction using Hamming code

Data Link Control: Line Discipline, Flow Control, Error Control

Data Link Protocols: Asynchronous Protocols, Synchronous Protocols, Character Oriented Protocols, Bit-Oriented Protocol, Link Access Procedures.

UNIT-IV:

Multiplexing: Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Multiplexing Application, DSL.

Local Area Networks: Ethernet, Other Ether Networks, Token Bus, Token Ring, FDDI. Metropolitan Area Networks: IEEE802.6, SMDS

Switching: Circuit Switching, Packet Switching, Message Switching.

Networking and Interfacing Devices: Repeaters, Bridges, Routers, Gateway, Other Devices.

UNIT-V:

Multiple Access Techniques:

Frequency- Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), Code - Division Multiple Access (CDMA), OFDM and OFDMA. Random Access, Aloha Carrier Sense Multiple Access (CSMA)- Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), Controlled Access-Reservation- Polling- Token Passing, Channelization.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1102	
Course Title: DIGITAL DATA COMMUNICATIONS	
CO-1	Understand the basic concepts of LAN and WAN technologies and topologies.
CO-2	Demonstrate an understanding of the elements of a protocol, and the concept of layering.
CO-3	Recognize the importance of networking standards, and their regulatory committees.
CO-4	Develop an understanding of the seven layers of the OSI model.
CO-5	Understand signals and signal encoding methods to communication service methods and data transmission modes.
CO-6	Demonstrate an understanding of basic concepts of error detection and correction at the data link layer and below.
CO-7	Develop an understanding of Data Link Layer protocols and technologies.
CO-8	Demonstrate an understanding of the differences between circuit switching and packet switching.

SYLLABUS: CODING THEORY &APPLICATIONS (M17 CS 1103)

UNIT–I:

Coding for Reliable Digital Transmission and Storage:

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

LinearBlockCodes:

Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of aBlock code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard arrayand Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT–II: Cyclic Codes:

Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

UNIT–III: Convolutional Codes:

Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQsystem.

UNIT–IV:

Burst–Error-CorrectingCodes:

Decoding of Single-Burst error Correcting Cyclic codes, Single-Burst-Error-Correcting Cyclic codes, Burst-Error-Correcting Convolutional Codes, Bounds on Burst Error-Correcting Capability, Interleaved Cyclic and Convolutional Codes, Phased-Burst –Error-Correcting Cyclic and Convolutional codes..

UNIT-V: BCH-CODES

BCH code- Definition, Minimum distance and BCH Bounds, Decoding Procedure for BCH Codes- Syndrome Computation and Iterative Algorithms, Error Location Polynomials and Numbers for single and double error correction

Course Outcomes for First Year First Semester Course	
Course Code:M17 CS 1103	
Course Title:CODING THEORY & APPLICATIONS	
CO-1	Analyze the information theoretic problems from various disciplines like computer science, mathematics, statistics and communication engineering.
CO-2	Apply coding techniques in various communication systems like wireless communications to achieve coding gain at low SNR values.
CO-3	Build new structures for encoder and decoder to address the issues in evaluating performance of communication system.
CO-4	Implement coding techniques in real time systems

SYLLABUS: ADVANCED DIGITAL SIGNAL PROCESSING (M17 CS 1104)

UNIT–I:

Review of DFT, FFT, IIR Filters and FIR Filters:

Multi Rate Signal Processing: Introduction, Decimation by a factor D, Interpolation by afactor I, Sampling rate conversion by a rational factor I/D, Multistage Implementation of Sampling Rate Conversion, Filter design & Implementation for sampling rate conversion

UNIT–II:

Applications of Multi Rate Signal Processing:

Design of Phase Shifters, Interfacing of Digital Systems with Different Sampling Rates,Implementation of Narrow Band Low Pass Filters, Implementation of Digital Filter Banks,Sub-band Coding of Speech Signals, Quadrature Mirror Filters, Trans-multiplexers, OverSamplingA/Dand D/AConversion.

UNIT-III:

Non-Parametric Methods of Power Spectral Estimation: Estimation of spectra from finite duration observation of signals, Non-parametric Methods: Bartlett, Welch & Blackman-Tukey methods, Comparison of all Non-Parametric methods

UNIT–IV:

Implementation of Digital Filters:

Introduction to filter structures (IIR & FIR), Frequency sampling structures of FIR, Lattice structures, Forward prediction error, Backward prediction error, Reflection coefficients for lattice realization, Implementation of lattice structures for IIR filters, Advantages of lattice structures.

UNIT–V:

Parametric Methods of Power Spectrum Estimation: Autocorrelation & Its Properties, Relation between auto correlation & model parameters, AR Models - Yule-Walker & Burg Methods, MA & ARMA models for power spectrum estimation, Finite word length effect in IIR digital Filters – Finite word-length effects in FFT algorithms.

Course Outcomes for First Year First Semester Course	
Course Code:M17 CS 1104	
Course Title:ADVANCED DIGITAL SIGNAL PROCESSING	
CO-1	Demonstrate advanced knowledge in Filter banks and Wavelets, Efficient power Spectral Estimation Techniques, Adaptive filters.
CO-2	To design adaptive filters for a given application
CO-3	To design multi rate DSP systems
CO-4	Learn Applications of Multi rate signal processing
CO-5	Analyze complex engineering problems critically for conducting research in Adaptive filter design
CO-6	Solve engineering problems by designing computationally efficient DSP algorithms for feasible and optimal solutions in digital signal processing field
CO-7	Contribute to scientific research in signal processing and inter disciplinary areas like cellular mobile communications, multi rate signal processing and spectral analysis

SYLLABUS: RADAR SIGNAL PROCESSING (M17 CS 1105)
(ELECTIVE-I)

UNIT-I:

Introduction:

Radar Block Diagram, Bistatic Radar, Monostatic Radar, Radar Equation, Information Available from Radar Echo. Review of Radar Range Performance– General Radar Range Equation, Radar Detection with Noise Jamming, Beacon and Repeater Equations, MTI and Pulse Doppler Radar. Matched Filter Receiver – Impulse Response, Frequency Response Characteristic and its Derivation, Matched Filter and Correlation Function, Correlation Detection and Cross Correlation Receiver, Efficiency of Non-Matched Filters, Matched Filter for Non-White Noise.

UNIT-II:

Detection of Radar Signals in Noise:

Detection Criteria – Neyman-Pearson Observer, Likelihood-Ratio Receiver, Inverse Probability Receiver, Sequential Observer, Detectors–Envelope Detector, Logarithmic Detector, I/Q Detector. Automatic Detection-CFAR Receiver, Cell Averaging CFAR Receiver, CFAR Loss, CFAR Uses in Radar. Radar Signal Management–Schematics, Component Parts, Resources and Constraints

UNIT-III:

Wave form Selection:

Radar Ambiguity Function and Ambiguity Diagram – Principles and Properties; Specific Cases –Ideal Case, Single Pulse of Sine Wave, Periodic Pulse Train, Single Linear FM Pulse, Noise LikeWaveforms, Waveform Design Requirements, Optimum Waveforms for Detection in Clutter,Familyof Radar Waveforms.

UNIT-IV:

Pulse Compression in Radar Signals:

Introduction,Significance,Types,LinearFMPulseCompression–BlockDiagram,Characteristics, Reduction of Time Side lobes, Stretch Techniques, Generation and Decoding ofFM Waveforms – Block Schematic and Characteristics of Passive System, Digital Compression,SAWPulse Compression.

UNITV:

Phase Coding Techniques:

Principles, Binary Phase Coding, Barker Codes, Maximal Length Sequences (MLS/LRS/PN), Block Diagram of a Phase Coded CW Radar. Poly Phase Codes : Frank Codes, Costas Codes, Non-Linear FM Pulse Compression, Doppler Tolerant PC Waveforms – Short Pulse, Linear Period Modulation (LPM/HFM), Sidelobe Reduction for Phase Coded PC Signals.

Course Outcomes for First Year First Semester Course	
Course Code:M17 CS 1105	
Course Title:RADAR SIGNAL PROCESSING (ELECTIVE-I)	
CO-1	Demonstrate knowledge in Characteristics of matched filter, Detection criteria of radar signals in noise environment, Radar waveform design requirements, Pulse compression techniques, Different coding techniques.
CO-2	Develop skills in designing Radar systems in different noise environments
CO-3	Apply appropriate techniques for radar signal de-noising.

SYLLABUS: OPTICAL COMMUNICATION TECHNOLOGY (M17 CS 1106)
(ELECTIVE-I)

UNIT–I:

Signal propagation in Optical Fibers:

Geometrical Optics approach and Wave Theory approach, Loss and Bandwidth, Chromatic Dispersion, Non Linear effects- Stimulated Brillouin and Stimulated Raman Scattering, Propagation in a Non-Linear Medium, Self-Phase Modulation and Cross Phase Modulation, Four Wave Mixing, Principle of Solitons.

UNIT–II:

Fiber Optic Components for Communication &Networking:

Couplers, Isolators and Circulators, Multiplexers, Bragg Gratings, Fabry-Perot Filters, Mach Zender Interferometers, Arrayed Waveguide Grating, Tunable Filters, High Channel Count Multiplexer Architectures, Optical Amplifiers, Direct and External Modulation Transmitters, Pump Sources for Amplifiers, Optical Switches and Wavelength Converters.

UNIT–III:

Modulation and Demodulation:

Signal formats for Modulation, Subcarrier Modulation and Multiplexing, Optical Modulations – Duobinary, Single Side Band and Multilevel Schemes, Ideal and Practical receivers for Demodulation, Bit Error Rates, Timing Recovery and Equalization, Reed-Solomon Codes for Error Detection and Correction.

UNIT-IV:

Transmission System Engineering:

System Model, Power Penalty in Transmitter and Receiver, Optical Amplifiers, Crosstalk and Reduction of Crosstalk, Cascaded Filters, Dispersion Limitations and Compensation Techniques.

UNIT–V:

Fiber Non-linearities and System Design Considerations:

Limitation in High Speed and WDM Systems due to Non-linearities in Fibers, Wavelength Stabilization against Temperature Variations, Overall System Design considerations – Fiber Dispersion, Modulation, Non-Linear Effects, Wavelengths, All Optical Networks.

Course Outcomes for First Year First Semester Course	
Course Code:M17 CS 1106	
Course Title:OPTICAL COMMUNICATION TECHNOLOGY (ELECTIVE-I)	
CO-1	Demonstrate Knowledge in Linear and Non-linear Characteristics of Optical fiber, Fiber design considerations, Minimization of Losses in Cable design, Understanding the operation of advanced fiber optic components, Modulation and demodulation techniques, Access networks.
CO-2	Analyze complex engineering problems critically in the domain of optical communication for conducting research.
CO-3	Formulate solutions to problems related to optical communication to meet societal and industrial needs.
CO-4	Apply appropriate techniques to complex engineering activities in the field of communication networks.

ADVANCED COMPUTER NETWORKS (M17 CS 1107)
(ELECTIVE-I)

UNIT-I:

Congestion and Quality of Service (QoS):

Data traffic, Congestion, Congestion Control, Two examples, Quality of Service, Techniques to improve QOS, Integrated Services and Differential services. **Queue Management:** Passive-Drop trial, Drop front, Random drop, Active- early Random drop, Random Early detection

UNIT-II:

X.25 Standards: X.25 Layers, X.21 Protocol , **Frame Relay**: Introduction, Frame relay operation, Frame relay layers, Congestion control, Leaky Bucket algorithms, ATM: Design goals, ATM architecture, Switching, Switch Fabric, ATM layers, Service classes, ATM applications

UNIT-III:

Interconnection Networks: Introduction, Banyan Networks, Properties, Crossbar switch, Three stage Class networks, Rearrangeble Networks, Folding algorithm, Benes Networks, Lopping algorithm, Bit allocation algorithm. SONET/SDH: Synchronous Transport signals, Physical configuration, SONET layers, SONET Frame.

UNIT-IV:

Spread Spectrum: Introduction, Basic concept, Protection against Jamming, Spreading codes (PN sequence), Generation, Properties, Types of Spread Spectrum Modulation, Application of Spread Spectrum. **Private Networks**: Virtual Private Networks, Network Address Translation **Next Generation**: IPV6 Transition from IPV4 to IPV6, **Mobile IP:** Addressing, Agents, Three phases, Inefficiency in Mobile IP

UNIT-V:

Wireless Networks: Wireless LAN: IEEE802.11, Architecture, MAC Sub Layer, Addressing Mechanism, Physical Layer. **Bluetooth:** Architecture, Bluetooth layers, Radio layer, Base band layer, L2CAP, **Wireless WAN:** The Cellular Concept, Cell, Frequency reuse, Principle, Channel Assignment Strategies, Interference and system capacity, Types of interference, Improving capacity in cellular system, Handoff, AMPS, D-AMPS, GSM, CDMA, GPRS, 3G & 4G technologies..

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1107	
Course Title:ADVANCED COMPUTER NETWORKS (ELECTIVE-I)	
CO-1	Configure PCs running Linux so that they receive IP addresses, have default routes, can resolve host names, and so on. (And similarly for Windows, if time permits.)
CO-2	Apply knowledge of the TCP/IP layering model to intelligently debug networking problems.
CO-3	Use Linux commands to understand how a PC is configured.
CO-4	Differentiate between different LAN-based forwarding devices so that they can make thoughtful suggestions on how to build a network.
CO-5	Write networking code that uses TCP and UDP in client-server applications.

WIRELESS LANS AND PANS (M17 CS 1108)
(ELECTIVE-II)

UNIT–I:

Wireless System & Random Access Protocols:

Introduction, First and Second Generation Cellular Systems, Cellular Communications from 1G to 3G, Wireless 4G systems, The Wireless Spectrum; Random Access Methods: Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA).

UNIT–II:

Wireless LANs:

Introduction, importance of Wireless LANs, WLAN Topologies, Transmission Techniques: Wired Networks, Wireless Networks, comparison of wired and Wireless LANs; WLAN Technologies: Infrared technology, UHF narrowband technology, Spread Spectrum technology

UNIT–III:

The IEEE 802.11 Standard for Wireless LANs:

Network Architecture, Physical layer, The Medium Access Control Layer; MAC Layer issues:Hidden Terminal Problem, Reliability, Collision avoidance, Congestion avoidance, Congestioncontrol,Security, TheIEEE 802.11eMACprotocol

UNIT–IV:

Wireless PANs:

Introduction, importance of Wireless PANs, The Bluetooth technology: history and applications, technical overview, the Bluetooth specifications, piconet synchronization and Bluetooth clocks, Master-Slave Switch; Bluetooth security; Enhancements to Bluetooth: Bluetooth interference issues, Intra and Inter Piconet scheduling, Bridge selection, Traffic Engineering, QoS and Dynamics Slot Assignment, Scatternet formation.

UNIT–V:

The IEEE 802.15 working Group for WPANs:

The IEEE 802.15.3, The IEEE 802.15.4, ZigBee Technology, ZigBee components and network topologies, The IEEE 802.15.4 LR-WPAN Device architecture: Physical Layer, Data Link Layer, The Network Layer, Applications; IEEE 802.15.3a Ultra wideband.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1108	
Course Title:WIRELESS LANS AND PANS (ELECTIVE-II)	
CO-1	Able to understand the second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Bluetooth and personal area networks.
CO-2	Able to understand the concepts of spectrum allocation, basic cellular system, frequency reuse, channel assignment strategies, handoff strategies, interference, improving coverage and capacity, cell splitting.
CO-3	Able to understand various multiple accesses techniques: FDMA, TDMA, spread spectrum multiple access, SDMA.
CO-4	Able to understand the communication in the infrastructure , iIS-95 CDMA forward channel, IS-95 CDMA risers channel, packet and frame formats in IS-95,IMT -20000, forward channel in W-CDMA.
CO-5	Able to understand the Historical overviews of the land industry, evolution of the wan industry, wireless home networking IEEE 802.11 the physical layer, MAC layer wireless ATM.

SYLLABUS: MOBILE COMPUTING TECHNOLOGIES (M17 CS 1109)
(ELECTIVE-II)

UNIT–I:

Introduction to Mobile Computing Architecture:

Mobile Computing – Dialog Control – Networks – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Security in Mobile Computing – Architecture for Mobile Computing – Three Tier Architecture – Design considerations for Mobile Computing – Mobile Computing through Internet – Making existing Applications Mobile Enabled..

UNIT–II:

Cellular Technologies: GSM, GPS, GPRS, CDMA and 3G

Bluetooth – Radio Frequency Identification – Wireless Broadband – Mobile IP – Internet Protocol Version 6 (IPv6) – Java Card – GSM Architecture – GSM Entities – Call Routing in GSM – PLMN Interfaces – GSM addresses and Identifiers – Network aspects in GSM – Authentication and Security – Mobile computing over SMS – GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS – Spread Spectrum technology – Is-95 – CDMA Versus GSM – Wireless Data – Third Generation Networks – Applications on 3G

UNIT–III:

Wireless Application Protocol (WAP) and Wireless LAN:

WAP – MMS – Wireless LAN Advantages – IEEE 802.11 Standards – Wireless LAN Architecture – Mobility in wireless LAN

Intelligent Networks and Interworking:

Introduction – Fundamentals of Call processing – Intelligence in the Networks – SS#7 Signaling – IN Conceptual Model (INCM) – soft switch – Programmable Networks – Technologies and Interfaces for IN

UNIT–IV:

Client Programming, Palm OS, Symbian OS, WinCE Architecture:

Introduction – Moving beyond the Desktop – A Peek under the Hood: Hardware Overview – Mobile phones – PDA – Design Constraints in Applications for Handheld Devices – Palm OS architecture – Application Development – Multimedia – Symbian OS Architecture – Applications for Symbian, Different flavors of Windows CE -Windows CE Architecture

J2ME: JAVA in the Handset – The Three-prong approach to JAVA Everywhere – JAVA 2 Micro Edition (J2ME) technology – Programming for CLDC – GUI in MIDP – UI Design Issues – Multimedia – Record Management System – Communication in MIDP – Security considerations in MIDP – Optional Packages

UNIT–V:

Voice over Internet Protocol and Convergence:

Voice over IP- H.323 Framework for Voice over IP – Session Initiation Protocol – Comparision between H.323 and SIP – Real Time protocols – Convergence Technologies – Call Routing – VoiceoverIPApplications–IPmultimediasubsystem(IMS) –MobileVoIP

Security Issues in Mobile Computing: Introduction–Information Security–Security Techniques and Algorithms – Security Protocols– Public Key Infrastructure – Trust – Security Models– Security frame works for Mobile Environment

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1109	
Course Title: **MOBILE COMPUTING TECHNOLOGIES (ELECTIVE-II)**	
CO-1	Apply advanced data communicating methods and networking protocols for wireless and mobile environments
CO-2	Utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment
CO-3	Create web sites suitable for mobile environments
CO-4	Select components and networks for particular application
CO-5	Creatively analyze mobile and wireless networks
CO-6	Critically analyze security issues of mobile and wireless computing systems

SYLLABUS: NETWORK SECURITY &CRYPTOGRAPHY (M17 CS 110)
(ELECTIVE-II)

UNIT-I:

Introduction:

Attacks, Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques.

Modern Techniques:

Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations.

UNIT-II:

Encryption Algorithms:

Triple DES, International Data Encryption algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric block cifers. Conventional Encryption :Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation..

UNIT-III:

Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptograpy. Number Theory: Prime and Relatively prime numbers, Modular arithmetic, Fermat's and Euler's theorems, Testing for primality, Euclid's Algorithm, the Chinese remainder theorem, Discrete logarithms.

UNIT-IV:

Message Authentication and Hash Functions: Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs. Hash and Mac Algorithms: MD File, Message digest Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC. Digital signatures and Authentication protocols: Digital signatures, Authentication Protocols, Digital signature standards

Authentication Applications: Kerberos, X.509 directory Authentication service. Electronic Mail Security: Pretty Good Privacy,S/MIME.

UNIT–V:

IP Security: Overview, Architecture, Authentication, Encapsulating Security Payload, Combining securityAssociations, Key Management. Web Security: Web Security requirements, Secure sockets layerandTransport layer security, SecureElectronicTransaction.

Intruders, Viruse sand Worms

Intruders, Viruses and Related threats.

Fire Walls: Firewall Design Principles, Trusted systems.

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1110	
Course Title: NETWORK SECURITY & CRYPTOGRAPHY (ELECTIVE-II)	
CO-1	Acquire thorough knowledge about Encryption Algorithms
CO-2	Acquire thorough knowledge about cryptography
CO-3	Acquire thorough knowledge about techniques for access control and Email security.
CO-4	Develop security algorithms in the network.

SYLLABUS: OPTICAL& DATA COMMUNICATIONS LABORATORY
(M17 CS 1111)

OPTICAL COMMUNICATIONS EXPERIMENTS

1. D.C Characteristics of light sources /detectors (LED, Laser diode and PIN photo diode.)
2. Measurement of Numerical aperture, Propagation and Bending Loss in fiber.
4. Analog link set up using a fiber
5. Digital link set up using a fiber
6. Set up of time division multiplexing using fiber optics
7. Digital Fiber Optical Transmitter and Receiver

DATA COMMUNICATIONS EXPERIMENTS

8. Study of serial interface RS – 232
9. Study of pc to pc communication using parallel port
10. To establish pc-pc communication using LAN
11. Study of LAN using star topology, bus topology and tree topology
12. Study and configure modem of a computer
13. To configure a hub/switch
14. To study the interconnections of cables for data communication
15. Study of a wireless communication system

Course Outcomes for First Year First Semester Course	
Course Code: M17 CS 1111	
Course Title: OPTICAL & DATA COMMUNICATIONS LABORATORY	
CO-1	Students can identify the type of fiber optical cable and test their applications.
CO-2	Students will have the awareness to select appropriate optical source and detector for different applications
CO-3	Students can operate and modify the setting in any kind of microwave equipment
CO-4	Understand the fundamental concepts of data communications and networking
CO-5	Identify different components and their respective roles in a computer communication system.
CO-6	Apply the knowledge, concepts and terms related to data communication and networking.
CO-7	Solve problems in networking by referring to problems solving steps through relevant information by choosing suitable techniques.
CO-8	Acquaint them-selves with networking software simulation tools, configuring of networking devices and understand their functionality.
CO-9	Know the strategies for securing network applications
CO-10	Appreciate usefulness and importance of computer communication in today life and society.

Regulation: R17	**M.Tech. II - Semester**

ELECTRONICS & COMMUNICATION ENGINEERING (COMMUNICATION SYSTEMS)
(under Choice Based Credit System / Elective Course System)

SCHEME OF INSTRUCTION &EXAMINATION
(With effect from 2017-18 admitted Batch onwards)

CodeNo.	Name of the Subject	C	Cr	L	Tutorial Hrs	Lab Hrs	Internal Marks	External Marks	Total Marks
M17CS1201	RF Circuit Design	ES	3	3	1	--	30	70	100
M17CS 1202	Wireless Communications and Networks	ES	3	3	1	--	30	70	100
M17CS 1203	Image and Video Processing	ES	3	3	1	--	30	70	100
M17CS 1204	Software Defined Radio	ES	3	3	1	--	30	70	100
#ELE-3	Elective-III	ES	3	3	1	--	30	70	100
#ELE-4	Elective-IV	ES	3	3	1	--	30	70	100
M17CS 1211	Advanced Communications Laboratory	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	Course
#ELE-3	M17CS1205	Soft Computing Techniques
	M17CS1206	Smart Antennas
	M17CS1207	Secure Communications
#ELE-4	M17CS1208	Optical Networks
	M17CS1209	Digital Signal Processors and Architectures
	M17CS1210	Internet Of Things

SYLLABUS: RF CIRCUIT DESIGN (M17 CS 1201)

UNIT-I:

Introduction to RF Electronics:

The Electromagnetic Spectrum, units and Physical Constants, Microwave bands– RF behavior of Passive components: Tuned resonant circuits, Vectors, Inductors and Capacitors - Voltage andCurrentin capacitorcircuits– TunedRF/IFTransformers.

UNIT-II:

Transmission Line Analysis: Examples of transmission lines- Transmission line equations and Biasing- Micro Strip Transmission Lines- Special Termination Conditions- sourced and Loaded Transmission Lines. Single And Multiport Networks: The Smith Chart, Interconnectivity networks, Network properties and Applications, Scattering Parameters.

UNIT-III:

Matching and Biasing Networks:

Impedance matching using discrete components – Micro strip line matching networks, Amplifierclasses of Operation and Biasing networks.RF Passive & Active Components: Filter Basics –Lumped filter design – Distributed Filter Design – Diplexer Filters- Crystal and Saw filters-Active Filters - Tunable filters – Power Combiners / Dividers – Directional Couplers – HybridCouplers–Isolators.RF Diodes – BJTs-FETs-HEMTs andModels.

UNIT-IV:

RF Transistor Amplifier Design: Characteristics of Amplifiers - Amplifier Circuit Configurations, Amplifier Matching Basics, Distortion and noise products, Stability Considerations, Small Signal amplifier design, Power amplifier design, MMIC amplifiers, Broadband High Power multistage amplifiers, Low noise amplifiers, VGA Amplifiers.

UNIT-V:

Oscillators: Oscillator basics, Low phase noise oscillator design, High frequency Oscillator configuration, LC Oscillators, VCOs, Crystal Oscillators, PLL Synthesizer, and Direct Digital Synthesizer. **RF Mixers:** Basic characteristics of a mixer - Active mixers- Image Reject and Harmonic mixers, Frequency domain considerations.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1201	
Course Title:RF CIRCUIT DESIGN	
CO-1	Demonstrate advanced knowledge in RF Electronics Transmission line analysis, Matching and biasing networks, RF Passive and Active component, RF Transistor amplifier design, Oscillators and RF Mixers
CO-2	Analyze complex problems critically in the domains of RF field, RF Passive and Active components as well as a smart antenna techniques for better spectrum exploitation for conducting research
CO-3	Solve engineering problems to arrive at optimal solutions in compliance with public health and safety, cultural, societal and environmental factors in the core areas of RF Circuit design

SYLLABUS: WIRELESS COMMUNICATIONS AND NETWORKS (M17 CS 1202)

UNIT-I:

The Cellular Concept-System Design Fundamentals:

Introduction, Frequency Reuse, Interference and system capacity – Co channel Interference andsystem capacity, Channel planning for Wireless Systems, Adjacent Channel interference , PowerControl for Reducing interference, Improving Coverage & Capacity in Cellular Systems- CellSplitting, Sectoring, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Hand off Considerations, Trunking and Grade of Service

UNIT–II:

Mobile Radio Propagation: Large-Scale Path Loss:

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power toElectric Field, Basic Propagation Mechanisms, **Reflection**: Reflection from Dielectrics, BrewsterAngle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, **Diffraction**: Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model,Indoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model, Attenuation Factor Model, Signalpenetrationinto buildings, RayTracingand SiteSpecific Modeling.

UNIT–III:

Mobile Radio Propagation: Small–Scale Fading and Multipath

Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.

UNIT-IV:

Equalization and Diversity

Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity -Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration-Selection Diversity, Feedback or Scanning Diversity, Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver

UNIT-V:

Wireless Networks

Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11, IEEE 802.11 Medium Access Control, Comparison of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, HiperLan, WLL

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1202	
Course Title: WIRELESS COMMUNICATIONS AND NETWORKS	
CO-1	Understand the basics of Wireless Communication Networks.
CO-2	Learn about path losses in Mobile Radio Propagation and different path loss models.
CO-3	Learn different types of small scale fading and simulation of different fading models.
CO-4	Learn different Equalization and Diversity algorithms.
CO-5	Learn advantages and disadvantages of WLAN and various IEEE standards

SYLLABUS: IMAGE AND VEDIO PROCESSING (M17 CS 1203)

UNIT–I:

Fundamentals of Image Processing and Image Transforms:

Introduction, Image sampling, Quantization, Resolution, Image file formats, Elements of image processing system, Applications of Digital image processing, Introduction, Need for transform, image transforms, Fourier transform, 2 D Discrete Fourier transform and its transforms, Importance of phase, Walsh transform, Hadamard transform, Haar transform, slant transform Discrete cosine transform, KL transform, singular value decomposition, Radon transform, comparison of different image transforms..

UNIT–II:

ImageEnhancement:

Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

Image Restoration:

Introduction to Image restoration, Image degradation, Types of image blur, Classification of image restoration techniques, Image restoration model, Linear and Nonlinear image restoration techniques, Blind de convolution

UNIT–III:

Image Segmentation:

Introduction to image segmentation, Point, Line and Edge Detection, Region based segmentation., Classification of segmentation techniques, Region approach to image segmentation, clustering techniques, Image segmentation based on thresholding, Edge based segmentation, Edge detection and linking, Hough transform, Active contour

Image Compression:

Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression scheme, Classification of image compression schemes, Fundamentals of information theory, Run length coding, Shannon – Fano coding, Huffman coding, Arithmetic coding, Predictive coding, Transformed based compression, Image compression standard, Wavelet-based image compression, JPEG Standards.

UNIT-IV:

Basic Steps of Video Processing:

Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, Filtering operations.

UNIT–V:

2-D Motion Estimation:

Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CS 1203	
Course Title:IMAGE AND VEDIO PROCESSING	
CO-1	Demonstrate sufficient understanding of theory of image and video processing including image/video representation, image /video filtering, image/video compression, and transport over the Internet.
CO-2	Analyze and interpret the results of image processing methods and algorithms.
CO-3	Demonstrate the ability to implement basic image/video processing operations using MATLAB.
CO-4	Implement a complete image processing system to achieve a specific task, and analyze and interpret the results of this system.

SYLLABUS: SOFTWARE DEFINED RADIO (M17 CS 1204)

UNIT-I:

Introduction:

The Need for Software Radios, What is Software Radio, Characteristics and benefits of software radio- Design Principles of Software Radio, RF Implementation issues- The Purpose of RF Front – End, Dynamic Range- The Principal Challenge of Receiver Design – RF Receiver Front- End Topologies- Enhanced Flexibility of the RF Chain with Software Radios-Importance of the Components to Overall Performance- Transmitter Architectures and Their Issues- Noise and Distortion in the RF Chain, ADC and DAC Distortion

UNIT-II:

Multi Rate Signal Processing:

Introduction- Sample Rate Conversion Principles- Polyphase Filters- Digital Filter Banks Timing Recovery in Digital Receivers Using Multirate Digital Filters.

Digital Generation of Signals:

Introduction- Comparison of Direct Digital Synthesis with Analog Signal Synthesis-Approachesto Direct Digital Synthesis- Analysis of Spurious Signals- Spurious Components due to Periodicjitter- Band Pass Signal Generation- Performance of Direct Digital Synthesis Systems- HybridDDS-PLL Systems- Applications of Direct Digital Synthesis- Generation of Random Sequences-ROMCompression Techniques.

UNIT-III:

Analog to Digital and Digital to Analog Conversion:

Parameters of ideal data converters- Parameters of Practical data converters- Analog to Digital and Digital to Analog Conversion- Techniques to improve data converter performance-Common ADC and DAC architectures.

UNIT-IV:

Digital Hardware Choices:

Introduction- Key Hardware Elements- DSP Processors- Field Programmable Gate Arrays Trade-Offs in Using DSPs, FPGAs, and ASICs- Power Management Issues- Using a Combination of DSPs, FPGAs, and ASICs..

UNIT-V:

Object–Oriented Representation of Radios and Network Resources:

Networks- Object Oriented Programming- Object Brokers- Mobile Application Environments-Joint Tactical Radio System.

Case Studies in Software Radio Design: Introduction and Historical Perspective, Speak-easy-JTRS, Wireless Information Transfer System, SDR-3000 Digital Transceiver Subsystem, Spectrum Ware, CHARIOT.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CS 1204	
Course Title:SOFTWARE DEFINED RADIO	
CO-1	Understanding of analog RF components as front end block in implementation of SDR.
CO-2	Design circuits at different multi rate signaling technique for frequency conversion and Sampling issues.
CO-3	Understanding of ADC and DAC technology.
CO-4	Knowledge of Hardware and software development methods for embedded wireless systems
CO-5	Make system-level decisions for software defined radio technology and products.

SYLLABUS: SOFT COMPUTING TECHNIQUES
(M17 CS 1205)
(ELECTIVE-III)

UNIT–I:

Introduction:

Approaches to intelligent control, Architecture for intelligent control, Symbolic reasoning system, Rule-based systems, the AI approach, Knowledge representation - Expert systems

UNIT–II:

ArtificialNeuralNetworks:

Concept of Artificial Neural Networks and its basic mathematical model, McCulloch-Pitts neuron model, simple perceptron, Adaline and Madaline, Feed-forward Multilayer Perceptron, Learning and Training the neural network, Data Processing: Scaling, Fourier transformation, principal-component analysis and wavelet transformations, Hopfield network, Self-organizing network and Recurrent network, Neural Network based controller.

UNIT–III:

FuzzyLogicSystem:

Introduction to crisp sets and fuzzy sets, basic fuzzy set operation and approximate reasoning, Introduction to fuzzy logic modeling and control, Fuzzification, inferencing and defuzzification, Fuzzy knowledge and rule bases, Fuzzy modeling and control schemes for nonlinear systems, Self-organizing fuzzy logic control, Fuzzy logic control for nonlinear timedelay system.

UNIT–IV:

Genetic Algorithm:

Basic concept of Genetic algorithm and detail algorithmic steps, Adjustment of free parameters, Solution of typical control problems using genetic algorithm, Concept on some other search techniques like Tabu search and and-colony search techniques for solving optimization problems.

UNIT–V:

Applications:

GA application to power system optimisation problem, Case studies: Identification and control of linear and nonlinear dynamic systems using MATLAB-Neural Network toolbox, Stability analysis of Neural-Network interconnection systems, Implementation of fuzzy logic controller using MATLAB fuzzy-logic toolbox, Stability analysis of fuzzy control systems

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CS 1205	
Course Title: SOFT COMPUTING TECHNIQUES (ELECTIVE-III)	
CO-1	Differentiate between Soft Computing and hard computing.
CO-2	Understand and apply Artificial Neural Networks, Fuzzy Logic, and Genetic algorithms for different applications.
CO-3	Understand various applications of soft computing

SYLLABUS: SMART ANTENNAS (M17 CS 1206)
(ELECTIVE-III)

UNIT I

Introduction: Basic Idea of Smart Antenna, Benefits of Smart Antenna System, The Historical Development of Smart Antennas, Emerging fields of Smart Antennas. Early Forms of Spatial Processing, Review of Fundamentals of Electromagnetic Fields and Antennas. Array Fundamentals: Array Weighting-Blackman weights, Hamming Weights, Gaussian Weights, Kaiser Bessel Weights. Fixed Beam Arrays, Fixed Side lobe Cancelling, Retro directive Arrays.

UNIT II

Principles of Random Variables and Process: Definition of Random Variables, Probability Density Functions, Expectation and Moments, Common Probability Density Functions, Stationarity and Ergodicity, Autocorrelation and Power Spectral Density, Correlation Matrix. Fixed Weight Beam forming Basics: Maximum S/I Ratio, Minimum Mean Square Error, Maximum Likelihood, and Minimum Variance. Diversity, Secrorization. Adaptive Beam forming: Least Mean Squares (LMS), Sample Matrix Inversion (SMI), Recursive Least Squares (RLS), Constant Modulus (CM), Least Squares Constant Modulus, Conjugate Gradient (CG) Method, Spreading Sequence Array Weights, Description of the new SDMA receiver.

UNIT III

Angle of Arrival Estimation-I: Fundamentals of Matrix Algebra, Array Correlation Matrix, Non-Blind Beam forming, Blind Beam Forming, Angle of Arrival Estimation Methods: Bartlett AOA Estimate, Capon AOA Estimate, Linear Prediction AOA Estimate.

UNIT IV

Angle of Arrival Estimation-II: Maximum Entropy Angle of Arrival Estimate, Pisarenko Harmonic decomposition AOA Estimate, Min-Norm AOA Estimate, MUSIC AOA Estimate, ESPRIT AOA Estimate.

UNIT V

Smart Antenna Performance: Beam forming Array Performance, Receive Diversity Performance, Combined Diversity and Beam forming Performance, Choosing a Spatial Processing Technique, MultiUser Modulation Schemes.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CS 1206	
Course Title: SMART ANTENNAS (ELECTIVE-III)	
CO-1	Understand the applications of smart antennas.
CO-2	Know the various processing techniques.
CO-3	Discuss about design and simulation of various AOA estimation techniques using software
CO-4	Know the different diversity combining techniques and their significance.
CO-5	Know the Adaptive Algorithm Classification
CO-6	Know Direction of Arrival Estimation methods

SYLLABUS: SECURE COMMUNICATIONS (M17 CS 1207)
(ELECTIVE-III)

UNIT-I

Security concepts: Introduction to the Concept of Security, threats, security services, security mechanisms. Basic encryption techniques, Concept of cryptanalysis, Shannon's theory , Perfectsecrecy, Block ciphers, Cryptographic algorithms, Features of Data Encryption Standard, Linearand Differential Cryptanalysis, Advanced Encryption Standard, Stream ciphers, Pseudo randomsequence generators.

UNIT-II

Database Security: Security policies, Policy enforcement & related issues, Design principles, Multilevel relational data models, Security impact on database function, inference problem Public Key Infrastructure (PKI), Internet Security Protocols, Network Security.

UNIT-III

Software Security: Defining a discipline, A Risk Management Framework, Code review with atools, Architectural risk analysis, Software penetrating testing, Risk Based security Testing, AnEnterpriseS/Wsecurityprogram, Securityknowledge.

UNIT-IV

Intrusion detection: Defining Intrusion Detection, Security concepts intrusion Detection concept, determining strategies for Intrusion Detection, Responses, Technical issues.

UNIT-V

Biometric Security: Biometric Fundamentals, Types of Biometrics, Fingerprints and Hand Geometry, Facial and Voice Recognition, Iris and Retina scanning, Signature Recognition and Keystroke Dynamics, Behavioural and Esoteric Biometric Technologies, Issues Involving Biometrics, Privacy

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CS 1207	
Course Title: SECURE COMMUNICATIONS (ELECTIVE-III)	
CO-1	Conceptualize the necessity of Security.
CO-2	Understand the process involved in data modeling.
CO-3	Analyze and handle security risks.
CO-4	Understand latest technologies on security.

SYLLABUS: OPTICAL NETWORKS (M17 CS 1208)
(ELECTIVE-IV)

UNIT–I:

Client Layers of Optical Networks:

SONET / SDH – Multiplexing, Frame Structure, Physical Layer, Infrastructure, ATM – Functions, Adaptation layers, QoS, Flow Control Signaling and Routing, IP – Routing, QoS, MPLS, Storage Area Networks – ESCON, Fiber Channel, HIPPI, Gigabit Ethernet.

UNIT-II:

WDM network Elements and Design:

Optical Line Terminals and Amplifiers, Add/Drop Multiplexers, Optical Cross Connects, Costtrade-offs in Network Design, LTD and RWA Problems, Dimensioning – Wavelength Routing Networks, Statistical and Maximum Load Dimensioning Models.

UNIT–III:

Network Control and Management:

Network Management Functions, Optical Layer Services and Interfacing, Layers within Optical Layer, Multivendor Interoperability, Performance and Fault Management, Configuration Management, Optical Safety.

UNIT–IV:

Network Survivability:

Basic Concepts of Survivability, Protection in SONET/SDH Links and Rings, Protection in IP Networks, Optical Layer Protection–Service Classes, Protection Schemes, Inter working between Layers.

UNIT–V:

Access Networks and Photonic Packet Switching:

Network Architecture, Enhanced HFC, FTTC, Photonic Packet Switching – OTDM, Synchronization, Header Processing, Buffering, Burst Switching, Test Beds.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1208	
Course Title:OPTICAL NETWORKS (ELECTIVE-IV)	
CO-1	Solve a simple WDM network design and optimization problem.
CO-2	Define the main limitations and possibilities of the optical network technologies.
CO-3	Define the main differences between optical networking and traditional networking.
CO-4	Explain the benefits of optical layer survivability.
CO-5	Describe the main issues in management and control of optical networks.

SYLLABUS: DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES (M17 CS 1209)
(ELECTIVE-IV)

UNIT–I:

Introduction to Digital Signal Processing:

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation

Computational Accuracy in DSP Implementations:

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter..

UNIT–II:

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture andMemory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-III:

Programmable Digital Signal Processors:

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors..

UNIT–IV:

Analog Devices Family of DSP Devices:

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT–V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, ProgrammedI/O, Interrupts andI/O, Direct memory access(DMA).

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1209	
Course Title: DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES (ELECTIVE-IV)	
CO-1	Apply DFT and FFT algorithms for DSP application
CO-2	Apply the number format, dynamic range and various sources of errors in DSP system
CO-3	Implement application programs on a DSP processor
CO-4	Implement various DSP algorithms on TMS processors
CO-5	Implement FFT algorithms on TMS320C54XXDSP algorithm.

SYLLABUS: INTERNET OF THINGS (M17 CS 1210)

(ELECTIVE-IV)

UNIT– I

Introduction: IoT overview, The IoT paradigm, Smart objects, IoT Platforms (like Aurdino, ARM Cortex, Raspberry Pi / Intel Galileo), Bits and atoms, Convergence of Technologies. Introduction to Internet and web networking basics: HTTP, Rest, JSON, XML, Interfacing to Cloud Harnessing mobile computing for IoT

UNIT– II

Introduction to Technologies behind IoT: RFID, NFC, Mobil Data Technologies (GPRS, 3G, 4G), Wifi. Powering the IoT using low power wireless technologies like Bluetooth smart technology, Zigbee. WSN. RTLS + GPS Agents and Multi agent systems.

UNIT– III

IoT Architecture: Machine to Machine, Web of Things, IoT protocols (The Layering concepts , IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN - IPv6 over Low power Wireless Personal Area Networks)

UNIT– IV

IoT Applications and issues: Combination scenarios. Breaking assumptions. IoT in retail, IoT in healthcare, IoT in manufacturing. Prototyping Connected Objects: Open source prototype platforms, Arduino based internet communication. Integrating and accessing Internet services, Rasberry PI / Beagle board based Gateways, Data Analysis Techniques.

UNIT– V

Case Studies and Guest lectures from Industry (for different verticals like Retail, Healthcare, Home Automation etc).

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1210	
Course Title: INTERNET OF THINGS (ELECTIVE-IV)	
CO-1	Identify and describe different kinds of Internet-connected product concepts.
CO-2	Analyze design and develop prototypes models of Internet-connected products using various tools.
CO-3	Understand the challenges and apply right techniques for user-interaction with connected-objects.

SYLLABUS: ADVANCED COMMUNICATIONS LABORATORY (M17 CS 1211)

Note:

A. Minimum of 10 Experiments have to be conducted

B. All Experiments may be Simulated using MATLAB and to be verified using related training kits

1. Measurement of Bit Error Rate using Binary Data
2. Verification of minimum distance in Hamming code
3. Determination of output of Convolutional Encoder for a given sequence
4. Determination of output of Convolutional Decoder for a given sequence
5. Efficiency of DS Spread- Spectrum Technique
6. Simulation of Frequency Hopping (FH) system
7. Effect of Sampling and Quantization of Digital Image
8. Verification of Various Transforms (FT / DCT/ Walsh / Hadamard) on a given Image (Finding Transform and Inverse Transform)
9. Point, Line and Edge detection techniques using derivative operators.
10. Implementation of FIR filter using DSP Trainer Kit (C-Code/ Assembly code)
11. Implementation of IIR filter using DSP Trainer Kit (C-Code/ Assembly code)
12. Determination of Losses in Optical Fiber
13. Observing the Waveforms at various test points of a mobile phone using Mobile Phone Trainer
14. Study of Direct Sequence Spread Spectrum Modulation & Demodulation using CDMA-DSS-BER Trainer
15. Study of ISDN Training System with Protocol Analyzer
16. Characteristics of LASER Diode

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CS 1211	
Course Title: ADVANCED COMMUNICATIONS LABORATORY	
CO-1	Calculate BER using binary data
CO-2	Understand the importance of various filter implementations using DSP trainer kit
CO-3	Understanding the Waveforms at various test points of a mobile phone using Mobile Phone Trainer
CO-4	Studying the Performance of spread spectrum communication system.

Regulation: R17			M.Tech. III- Semester			
ELECTRONICS & COMMUNICATION ENGINEERING(COMMUNICATION SYSTEMS) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17CS 2101	Comprehensive Viva-Voce	Viva-Voce	2	50	-	50
M17CS 2102	Seminar-I	OralPresentation	2	50	-	50
M17CS 2103	Project Work Part-I	Review	16	50	-	50
Total			**20**	**150**	**-**	**150**

1. The Viva-Voce for the Comprehensive Viva-Voce and Seminar-I shall be held with theProject Guide, PG coordinator, and Head of the Department. The marks shall be awardedintheratio of 20, 10 and20 Marks by the members respectively

2. Candidates can do their Project Work Part-I&II work within the department or in anyindustry/research organization for two semesters (i.e. 3rd and 4th semesters). In case ofthesis done in an industry/research organization, one advisor (Guide) should be from the department and one advisor (Co-Guide) should be from the industry/research organization.

3. The Project Work Part-I should be submitted at the end of 3rd Semester and it will be evaluated through Review by a committee consisting of Head of the Department, PG coordinator and Project guide. The marks shall be awarded in the ratio of 20, 10 and 20Marks by the members respectively.

Regulation: R17			M.Tech. IV- Semester			
ELECTRONICS & COMMUNICATION ENGINEERING(COMMUNICATION SYSTEMS) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17CS 2201	Seminar-II	Oral presentation	2	50	-	50
M17CS 2202	Project Work Part-II	Viva-voce	18		100	100
Total			**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20 and 20 Marks by the members respectively

ELECTRICAL AND ELECTRONICS ENGINEERING

Regulation: R17					**M.Tech. I - Semester**				
ELECTRICAL & ELECTRONICS ENGINEERING (POWER SYSTEM AND AUTOMATION) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2020-21 admitted Batch onwards)									
CodeNo.	**Name of the Subject**	**C**	**Cr**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17PS 1101	Advanced Power system Operation and control	ES	3	3	1	--	30	70	100
M17PS1102	HVDC Transmission	ES	3	3	1	--	30	70	100
M17PS 1103	Reactive Power Compensation &Management	ES	3	3	1	--	30	70	100
M17PS 1104	Analysis of Power Electronics Converters	ES	3	3	1	--	30	70	100
#ELE-1	Elective-I	ES	3	3	1	--	30	70	100
#ELE-2	Elective-II	ES	3	3	1	--	30	70	100
M17PS 1113	Simulation Laboratory	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	Course Code	**Course**
#ELE-1	M17PS1105	ModernControl Theory
	M17PS1106	PowerSystemSecurity
	M17PS1107	OptimizationTechniques
	M17PS1108	GenerationandMeasurementofHighVoltage
#ELE-2	M17PS1109	RenewableEnergySystems
	M17PS1110	AdvancedDigitalSignalProcessing
	M17PS1111	PowerSystemReliability
	M17PS1112	ElectricalDistributionSystems

SYLLABUS: ADVANCED POWER SYSTEM OPERATION AND CONTROL (M17PS1101)

UNIT-I:

Generation with limited Energy supply: Take-or-pay fuel supply contract, composite generation production cost function. Solution by gradient search techniques, Base point and participation factor method, hard limits and slack variables, Fuel scheduling by linear programming. Hydroelectric plant models –short term hydrothermal scheduling problem – gradient approach.

UNIT-II:

Unit commitment problem: Constraints in UCP, UC solutions. UC Methods-priority list method, Forward Dynamic programming Approach and Lagrange Relaxation method.

UNIT-III:

Optimal power flow: Solution of OPF, gradient method, Newton‟s method, linear programming method with only real power variables, linear programming with AC power flow variables,security-constrainedoptimal power flow.

UNIT-IV:

Single area & Two areas Load Frequency Control: concept of single & two area Load frequency control: uncontrolled case and controlled case, tie-line bias control. Optimal two-area LF control steady state representation, performance Index and optimal parameter adjustment.

UNIT-V:

Interchange Evaluation and Power Pools Economy Interchange, Economy interchange Evaluation, Interchange Evaluation with unit commitment, Multiple Interchange contracts. After the- fact production costing, Transmission Losses in transaction Evaluation, other types of Interchange, power pools.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1101	
Course Title: ADVANCED POWER SYSTEM OPERATION AND CONTROL	
CO-1	Know the effect of generation with limited energy supply.
CO-2	Develop generation dispatching scheme for thermal and hydro units.
CO-3	Determine the unit commitment problem for economic load dispatch.
CO-4	Get the knowledge of load frequency control of single area and two area systems with and without control.
CO-5	Determine the interchange evaluation in interconnected power systems.

SYLLABUS: HVDS TRANSMISSION (M17PS1102)

UNIT-I:

Limitation of EHV AC Transmission, Advantages of HVDC Technical economical reliability aspects. HVDC Transmission: General considerations, Power Handling Capabilities of HVDC Lines, Basic Conversion principles, static converter configuration. Types of HVDC links Apparatus and its purpose.

UNIT-II:

Static Power Converters: 6-pulse bridge circuit and 12-pulse converters, converter station and Terminal equipment, commutation process, Rectifier and inverter operation, equivalent circuit for converter – special features of converter transformers. Comparison of the perform of diametrical connection with 6-pulse bridge circuit.

UNIT-III:

Control of HVDC Converters and systems: constant current, constant extinction angle and constant Ignition angle control. Individual phase control and equidistant firing angle control, DC power flow control. Factors responsible for generation of Harmonics voltage and current harmonics effect of variation of α and μ. Filters Harmonic elimination.

UNIT-IV:

Interaction between HV AC and DC systems – Voltage interaction, Harmonic instability problems and DC power modulation. Development of DC circuit Breakers, Multi-terminal DC links and systems; series, parallel and series parallel systems, their operation and control.

UNIT-V:

Transient over voltages in HV DC systems: Over voltages due to disturbances on DC side, over voltages due to DC and AC side line faults. Converter faults and protection in HVDC Systems: Converter faults, over current protection - valve group, and DC line protection, circuit breakers. Over voltage protection of converters, surge arresters.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1102	
Course Title: HVDC TRANSMISSION	
CO-1	Understand the various schemes of HVDC transmission.
CO-2	Understand the basic HVDC transmission equipment.
CO-3	Understand the control of HVDC systems.
CO-4	Understand the interaction between HVAC and HVDC system.
CO-5	Understand the various protection schemes of HVDC engineering.

SYLLABUS: REACTIVE POWER COMPENSATION & MANAGEMENT

(M17PS1103)

UNIT-I: Load Compensation

Objectives and specifications – reactive power characteristics – inductive and capacitive approximate biasing – Load compensator as a voltage regulator – phase balancing and power factor correction of unsymmetrical loads- examples.

UNIT-II: Reactive power compensation in transmission system:

Steady state -Uncompensated line – types of compensation – Passive shunt and series and dynamic shunt compensation – examples Transient state - Characteristic time periods – passive shunt compensation – static compensations- series capacitor compensation –compensation using synchronous condensers – examples

UNIT-III: Reactive power coordination:

Objective – Mathematical modeling – Operation planning – transmission benefits – Basic concepts of quality of power supply – disturbances- steady –state variations – effects of under voltages – frequency – Harmonics, radio frequency and electromagnetic interferences

UNIT-IV: Distribution side Reactive power Management:

System losses –loss reduction methods – examples – Reactive power planning – objectives – Economics Planning capacitor placement – retrofitting of capacitor banks

User side reactive power management: KVAR requirements for domestic appliances – Purpose of using capacitors – selection of capacitors – deciding factors – types of available capacitor, characteristics and Limitations

UNIT-V: Reactive power management in electric traction systems and are furnaces: Typical layout of traction systems – reactive power control requirements – distribution transformers- Electric arc furnaces – basic operations- furnaces transformer –filter requirements – remedial measures –power factor of an arc furnace

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1103	
Course Title:REACTIVE POWER COMPENSATION & MANAGEMENT	
CO-1	Learn various load compensations.
CO-2	Obtain the mathematical model of reactive power compensating devices.
CO-3	Get application of reactive power compensation in electrical traction & arc furnaces.

SYLLABUS: ANALYSISOF POWER ELECTRONIC CONVERTERS

(M17PS1104)

UNIT-I: AC voltage Controllers

Single Phase AC Voltage Controllers with RL and RLE loads-ac voltage controller‟s with PWM control-Effects of source and load inductances –synchronous tap changers Application numerical problems Three Phase AC Voltage controllers-Analysis of Controllers with star and delta connected resistive, resistive – inductive loads-Effects of source and load inductances– Application numerical problems

UNIT-II: AC-DC converters

Single phase Half controlled and Fully controlled Converters with RL load– Evaluation of input power factor and harmonic factor-Continuous and Discontinuous load current-Power factor improvements-Extinction angle control-symmetrical angle control-PWM single phase sinusoidal PWM-Single phase series converters-numerical problems. Three Phase ac-dc Converters- Half controlled and fully controlled Converters with RL load– Evaluation of input power factor and harmonic factor-Continuous and Discontinuous load current-three phase dual converters-Power factor improvements-three phase PWM-twelve pulse converters- numerical problems

UNIT-III: Power Factor Correction Converters

Single-phase single stage boost power factor corrected rectifier, power circuit principle of operation, and steady state- analysis, three phase boost PFC converter

UNIT-IV: PWM Inverters

Principle of operation-Voltage control of single phase inverters - sinusoidal PWM – modified PWM – phase displacement Control – Trapezoidal, staircase, stepped, harmonic injection and delta modulation – numerical problems. Voltage Control of Three-Phase Inverters- Sinusoidal PWM- 600 PWM- Third Harmonic PWM-Space Vector Modulation- Comparison of PWM Techniques-current source inverters-Variable dc link inverter - numerical problems

UNIT-V: Multi level inverters Introduction, Multilevel Concept, Types of Multilevel Inverters Diode-Clamped Multilevel Inverter, Principle of Operation, Features of Diode-Clamped Inverter, Improved Diode-Clamped Inverter- Flying-Capacitors Multilevel Inverter- Principle of Operation, Features of Flying-Capacitors Inverter- Cascaded Multilevel Inverter- Principle of Operation- Features of Cascaded Inverter-Switching Device Currents-DC-Link Capacitor Voltage Balancing- Features of Multilevel Inverters-Comparisons of Multilevel Converters

Course Outcomes for First Year First Semester Course	
Course Code:M17 PS 1104	
Course Title: ANALYSIS OF POWER ELECTRONIC CONVERTERS	
CO-1	Have the knowledge on principle of ac voltage controller and their control techniques.
CO-2	Convert ac voltage to dc voltage and different control strategies of the converter.
CO-3	Control the power factor of single phase and three phase ac to dc converters.
CO-4	Understand the conversion of dc to ac and their control strategies.
CO-5	Analyze different multilevel inverters to improve the quality of the output voltage of the inverter.

SYLLABUS: MODERN CONTROL THEORY (M17PS1105)
(ELECTIVE-I)

UNIT–I: State Variable Analysis

The concept of state – State Equations for Dynamic systems – State diagram - Linear Continuous time model for physical systems – Existence and Uniqueness of Solutions to Continuous – Time State Equations – Solutions – Linear Time Invariant Continuous – Time State Equations – State transition matrix and it"s properties

UNIT–II: State Variable Techniques

General concept of Controllability - General concept of Observability Controllability tests for Continuous &Time Invariant systems - Observability tests for Continuous &Time Invariant systems – Controllability and Observability of state model in Jordan Canonical form - Controllability and Observability Canonical forms of State model – State feedback controller design through pole assignment.

UNIT–III: Non Linear Systems–I

Introduction – Non Linear Systems – Types of Non – Linearities – Saturation – Dead – Zone –Backlash – Jump Phenomenon etc; - Singular Points – Introduction to Linearization of nonlinearsystems, properties of Non Linear Systems – Describing function – describing function analysis of nonlinear systems-Stability analysis of Non–Linear systems through describing functions.

UNIT–IV: Non Linear Systems–II

Introduction to phase – plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase – plane analysis of nonlinear control systems.

UNIT–V: Stability Analysis

Stability in the sense of Lyapunov, Lyapunov"s stability and Lyapunov"s instability theorems – Stability Analysis of the Linear Continuous time invariant systems by Lyapunov second method – Generation of Lyapunov functions – Variable gradient method – Krasooviski"s method.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1105	
Course Title: MODERN CONTROL THEORY (ELECTIVE-I)	
CO-1	Understanding the state variable approach is suitable for higher order.
CO-2	To analyze the concepts of controllability and observability.
CO-3	To analyze the various non-linearities through describing functions and phase plane analysis.
CO-4	Typical issues of stability and instability of continuous time in variant systems.

SYLLABU: POWER SYSTEM SECURITY (M17PS1106)
(ELECTIVE-I)

UNIT-I:

Short circuit analysis techniques in AC power Systems- Simulation of short circuit and open circuit faults using network theorems- fixed impedance short circuit analysis techniques time domain short circuit analysis in large scale power systems- analysis of time variation of AC and DC short circuit components

UNIT-II:

Fixed impedance Short circuit analysis of large scale power systems-general analysis of balanced, unbalanced and open circuit faults- 3-phase short circuit analysis in large scale power systems, Network equivalents and practical short circuit current assessments in large scale Ac power systems-general studies- uncertainties in short circuit current calculations-probabilistic Short circuit analysis

UNIT-III:

Risk assessment and safety considerations-control and limitation of high short circuit currents limitation of short circuit currents in power system operation, design and planning, Types of short circuit fault current limiters- earthing resistor or reactor connected to transformer neutral pyrotechnic fault current limiters- series resonant current limiters- saturable reactor limiters-other types of fault current limiters and their applications..

UNIT-IV:

Power System Security analysis- concept of security- security analysis and monitoring factors affecting power system security- detection of network problems –overview, contingency analysis for generator and line outages by ILPF method – fast decoupled inverse Lemma-based approach, network sensitivity factors – contingency selection –concentric relaxation and bounding

UNIT-V:

Computer control power systems – need for real time and computer control of power systems operating states of power system – SCADA- implementation considerations – software requirements for implementing above functions.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1106	
Course Title: POWER SYSTEM SECURITY (ELECTIVE-I)	
CO-1	Analyze the balanced and unbalanced power system under short circuit conditions.
CO-2	Understand how to minimize the short circuit effect on the power System.
CO-3	Design the power system with more security with real time control.
CO-4	Implant SCADA for power system security.

SYLLABUS: OPTIMIZATION TECHNIQUES (M17PS1107)
(ELECTIVE-I)

UNIT-I:

Introduction to Optimization: Introduction, Historical Development, Engineering applications of Optimization, Statement of Optimization Problem.

UNIT-II:

Classical Optimization Techniques: Introduction, Single variable optimization, Multi variable optimization with no constraints; Multivariable optimization with Equality constraints - Solution by Direct Substitution method, Method of Lagrangian multipliers; Multivariable optimization with inequality constraints: Kuhn-Tucker conditions.

UNIT-III:

Linear Programming: Introduction, Applications of Linear Programming, Standard Form of a Linear Programming, Basic Terminology and Definitions, Exceptional cases, Simplex method, Big-M method, Two-phase method, Revised Simplex method, Duality, Degene -racy Principle.

UNIT-IV:

Non–Linear Programming-I: Unconstrained One Dimensional Minimization Methods- Fibonacci Method, Quadratic Interpolation Method Non- Linear Programming: Un Constrained Optimnization: Univariate Method, Pattern Directions, Powell‟s Method, Cauchy‟s Method Or Steepest Descent Method, Powell‟s Conjugate Direction Method.

UNIT-V:

Non-Linear Programming-II: Constrained Optimization- Characteristics Of A Constrained Problem, Classification- Direct Methods, Indirect Methods- Interior Penalty Function Method, Exterior Penalty Function Method,

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1107	
Course Title: OPTIMIZATION TECHNIQUES (ELECTIVE-I)	
CO-1	After learning the techniques they can apply to engineering and other problems.

SYLLABUS: GENERATION &MEASUREMENTS OF HIGH VOLTAGES (M17PS1108) (ELECTIVE-I)

UNIT-I: Electrostatic fields and field stress control:

Electric fields in homogeneous Isotropic materials and in multi dielectric media-Simple configurations-field stress control. Methods of computing electrostatic fields-conductive analogues-Impedance networks Numerical techniques finite difference method-finite element method and charge simulation method.

UNIT-II: Generation of HighAC&DCVoltages:

Direct Voltages: AC to DC conversion methods electrostatic generators-Cascaded Voltage Multipliers. Alternating Voltages: Testing transformers-Resonant circuits and their applications, Tesla coil.

UNIT-III: Generation of Impulse Voltages:

Impulse voltage specifications-Impulse generations circuits-Operation, construction and design of Impulse generators-Generation of switching and long duration impulses. Impulse Currents: Generation of High impulse currents and high current pulses.

UNIT-IV: Measurement of High AC& DC Voltages:

Measurement of High D.C. Voltages: Series resistance meters, voltage dividers and generating voltmeters. Measurement of High A.C. Voltages: Series impedance meters electrostatic voltmeters potential transformers and CVTS-voltage dividers and their applications

UNIT-V: Measurement of Peak Voltages:

Sphere gaps, uniform field gaps, rod gaps. Chubb-Fortesque methods. Passive and active rectifier circuits for voltage dividers. Measurement of Impulse Voltages : Voltage dividers and impulse measuring systems generalized voltage measuring circuits-transfer characteristics of measuring circuits-L.V. Arms for voltage dividers-compensated dividers. Measurement of Impulse Currents : Resistive shunts-current transformers-Hall Generators and Faraday generators and their applications-Impulse Oscilloscopes.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1108	
Course Title: GENERATION & MEASUREMENTS OF HIGHVOLTAGES (ELECTIVE-I)	
CO-1	Understand numerical computation of electrostatic problems
CO-2	Understand numerical computation of electrostatic problems.
CO-3	Understand the techniques of generation of high AC, DC and transient voltages.
CO-4	Measure high AC, DC and transient voltages.

SYRLLABUS: RENEWABLE ENERGY SYSTEMS(M17PS1109)
(ELECTIVE-II)

UNIT-I:

Energy and Electricity: The World Energy Scene, the Environmental Impact of Energy Use, Generating Electricity, The Electrical Power System.

UNIT-II:

Features of Conventional and Renewable Generation: Introduction, Conventional Sources: Coal, Gasand Nuclear, Hydroelectric Power, Wind Power, PV and Solar Thermal Electricity, Tidal Power, Wave Power, Biomass, Summary of Power Generation Characteristics, Combining Sources.

UNIT-III:

Power Balance/Frequency Control: Introduction, Electricity Demand, Power Governing, Dynamic Frequency Control of Large Systems, Impact of Renewable Generation on Frequency Control and Reliability, Frequency Response Services from Renewable, Frequency Control Modelling, Energy Storage.

UNIT-IV:

Renewable Energy Generation in Power Systems: Distributed Generation, Voltage Effects, Thermal Limits, Other Embedded Generation Issues, Islanding, Fault Ride-through, Generator and Converter Characteristics.

UNIT-V:

Power System Economics and the Electricity Market: Introduction, The Costs of Electricity Generation, Economic Optimization in Power Systems., External Costs, Effects of Embedded Generation, Support Mechanisms for Renewable Energy, Electricity Trading. The Future–Towards a Sustainable Electricity Supply System: Introduction, The Future of Wind Power, The Future of Solar Power, The Future of Bio fuels, The Future of Hydro and Marine Power, Distributed Generation and the Shape of Future Networks.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1109	
Course Title: RENEWABLE ENERGY SYSTEMS (ELECTIVE-II)	
CO-1	Students will be able to understand the World Energy Generation and consumption Over the past and present;
CO-2	Students will be able to outline the technologies that are used to harness the Energy from Conventional and Non-conventional Sources.
CO-3	Students will be able to understand power governing, dynamic frequency control of large systems, Impact of Renewable generation on Frequency control
CO-4	Students will be able to explain the Issues Regarding Renewable Energy System in Power System
CO-5	Students will be able to outline the Power system economics and Electricity Market
CO-6	Students will have vision towards sustainable supply systems in Future.

ADVANCED DIGITAL SIGNAL PROCESSING (M17PS1110)
(ELECTIVE-II)

UNIT-I: Digital Filter Structure

Block diagram representation-Equivalent Structures-FIR and IIR digital filter Structures All pass Filters-tunable IIR Digital Filters-IIR tapped cascaded Lattice Structures-FIR cascaded Lattice structures-Parallel-Digital Sine-cosine generator-Computational complexity of digital filter structures.

UNIT-II: Digital filter design

Preliminary considerations-Bilinear transformation method of IIR filter design-design of Low pass high pass-Band pass, and Band stop- IIR digital filters-Spectral transformations of IIR filters, FIR filter design-based on Windowed Fourier series- design of FIR digital filters with least –mean- Square-error-constrained Least-square design of FIR digital filters

UNIT-III: DSP algorithm implementation

Computation of the discrete Fourier transform- Number representation-Arithmetic operations handling of overflow-Tunable digital filters-function approximation

UNIT-IV: Analysis of finite Word length effects

The Quantization process and errors- Quantization of fixed -point and floating -point Numbers Analysis of coefficient Quantization effects - Analysis of Arithmetic Round-off errors, Dynamic range scaling-signal- to-noise ratio in Low -order IIR filters-Low-Sensitivity Digital filters Reduction of Product round-off errors using error feedback-Limit cycles in IIR digital filters Round-off errors in FFT Algorithms.

UNIT V: Power Spectrum Estimation

Estimation of spectra from Finite Duration Observations signals – Non-parametric methods forpower spectrum Estimation – parametric method for power spectrum Estimation, Estimation ofspectral form-Finite duration observation of signals-Non-parametric methods for power spectrumestimation-Walshmethods-Blackman &torchymethod.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1110	
Course Title: ADVANCED DIGITAL SIGNAL PROCESSING (ELECTIVE-II)	
CO-1	Understand reliability analysis applied to power systems.
CO-2	Understand Markov Chains and application to power systems.
CO-3	Perform stability analysis of generation systems.
CO-4	Understand decomposition techniques applied to power system.

SYLLABUS: POWER SYSTEM RELIABILITY (M17PS1111)

(ELECTIVE-II)

UNIT-I:

Basic probability theory – rules for combining probabilities of events – Bernoulli`s trials –probability density and distribution functions – binomial- distributions – expected value and standard deviation of binomial Distribution.

UNIT-II:

Network Modelling and Reliability Analysis of Series, Parallel, Series-Parallel networks – complex networks – decomposition method Reliability functions F(t), F(t), R(t), h(t) and their relationship – exponential distributions – Expected value and standard deviation of exponentional distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF

UNIT-III:

Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabililties using STPM – two component repairable models – Frequency and duration concept – Evaluation of frequency of encountering state, mean cycle time, for one, two component repairable models – evaluation of cumulative probability and cumulative frequency of encountering merged states

UNIT-IV:

Generation system reliability analysis – reliability model of a generation system – recursive relation for unit addition and removal – load modelling – merging of generation load model – evaluation of transition rates for merged state model – cumulative Probability, cumulative frequency of failure evaluation – LOLP, LOLE.

UNIT-V:

Composite system reliability analysis decomposition method – distribution system reliability analysis – radial networks – weather effects on transmission lines – Evaluation of load and energy indices.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1111	
Course Title: POWER SYSTEM RELIABILITY (ELECTIVE-II)	
CO-1	Know the various components and usage of each component.
CO-2	Derive stat space model for a given systems and Apply the concept of Observability and Controllability for LTI system.
CO-3	Apply Z- transform in Engineering application related to digital control systems.
CO-4	Design classical controller based on bode plots and modern controllers based on the state space techniques
CO-5	Test the digital system which is useful after designing a particular system with respect to the stability point of view.

ELECTRICAL DISTRIBUTION SYSTEMS (M17PS1112)
(ELECTIVE-II)

UNIT-I: Distribution System Basics:

Brief description about electrical power transmission and distribution systems, Different types of distribution sub-transmission systems, Substation bus schemes, Factors effecting the substation location, Factors effecting the primary feeder rating, types of primary feeders, Factors affecting the primary feeder voltage level, Factors affecting the primary feeder loading.

UNIT-II: Distribution System Loads:

Various types of loads, Definitions of various terms related to system loading, Detailed description of distribution transformer loading, feeder loading, Modelling of star and delta connected loads, two-phase and single-phase loads, shunt capacitors

UNIT-III: Substations and feeders:

Rating of a distribution substation for square and hexagonal shaped distribution substation service area, Derivation of K constant, Radial feeder with uniformly and non-uniformly distributed loading..

UNIT-IV: Distribution System Load Flow:

Exact line segment model, Modified line model, approximate line segment model, Review of the two-winding transformer theory, two-winding auto transformer, Step-Voltage Regulators, Line drop compensator, Forward/Backward sweep distribution load flow algorithm.

UNIT-V: Voltage Drop and Power loss Calculation:

Detailed analysis of non-three phase primary lines, concepts of four-wire multi-grounded common-neutral distribution system, Percent power loss calculation, Distribution feeder cost calculation methods, Capacitor installation types, types of three-phase capacitor-bank connections, Economic justification for capacitors. Advanced topics in Distribution Systems: Basic reliability indices, Calculation of SAIDI and SAIFI, Distribution automation communication protocols: MODBUS, DNP 3.0, IEC 60870-5- 101, UCA 2.0, IEC 61850; Brief description of Smart-grid, Micro-grid, and Nano-grid with simple exaples, Concepts of distributed generation.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1112	
Course Title: ELECTRICAL DISTRIBUTION SYSTEMS (ELECTIVE-II)	
CO-1	Analyze a distribution system.
CO-2	Design equipment for compensation of losses in the distribution system.
CO-3	Design protective systems and co-ordinate the devices.
CO-4	Understand of capacitive compensation.
CO-5	Understand of voltage control.

SYLLABUS: SIMULATION LABORATORY (M17PS1113)

LIST OF EXPERIMENTS:

1. Formation of Y- Bus by Direct-Inspection Method.
2. Load Flow Solution Using Gauss Siedel Method
3. Load Flow Solution Using Newton Raphson Method
4. Load Flow Solution Using Fast Decoupled Method
5. Formation of Z-Bus by Z-bus building algorithm
6. Symmetrical Fault analysis using Z-bus
7. Unsymmetrical Fault analysis using Z-bus
8. Economic Load Dispatch with & without transmission losses
9. Transient Stability Analysis Using Point By Point Method
10. Load Frequency Control of Single Area Control& Two Area Control system with and without controllers.

Course Outcomes for First Year First Semester Course	
Course Code: M17 PS 1113	
Course Title: SIMULATION LABORATORY	
CO-1	After the completion of the lab they will verify the theoretical concepts of various aspects of Power System analysis.
CO-2	Graduate will demonstrate the ability to identify, formulate and solve Power System engineering problems.
CO-3	Graduate will demonstrate the ability to design and conduct experiments, analyze and interpret data.
CO-4	Graduates will demonstrate the ability to design a electrical systems or process as per needs and specifications.
CO-5	Graduate will demonstrate the skills to use modern engineering tools, software "sand equipment to analyze problem.

Regulation: R17					M.Tech. II - Semester				
ELECTRICAL & ELECTRONICS ENGINEERING (POWER SYSTEM AND AUTOMATION) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2020-21 admitted Batch onwards)									
Code No.	**Name of the Subject**	**C**	**C**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17PS 1201	Power system Dynamics &stability	ES	3	3	1	--	30	70	100
M17PS 1202	Real Time Control of Power Systems	ES	3	3	1	--	30	70	100
M17PS 1203	Artificial Intelligence Techniques	ES	3	3	1	--	30	70	100
M17PS 1204	Flexible AC Transmission Systems	ES	3	3	1	--	30	70	100
#ELE-3	Elective-I	ES	3	3	1	--	30	70	100
#ELE-4	Elective-II	ES	3	3	1	--	30	70	100
M17PS 1213	Power system laboratory	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	Course
#ELE-3	M17PS1205	SmartGridTechnologies
	M17PS1206	PowerQuality
	M17PS1207	AdvancedPowerSystemProtection
	M17PS1208	EHVACTransmission
#ELE-4	M17PS1209	PowerSystemDeregulation
	M17PS1210	HighVoltageTestingTechniques
	M17PS1211	PowerSystemTransients
	M17PS1212	VoltageStability

SYLLABUS: POWER SYSTEM DYNAMICS & STABILITY (M17PS1201)

UNIT-I:

System Dynamics: Synchronous machine model in state space from computer representation for excitation and governor system –modeling of loads and induction machines.

UNIT-II:

Steady state stability – steady state stability limit – Dynamics Stability limit – Dynamic stability analysis – State space representation of synchronous machine connected to infinite bus time response – Stability by eigh value approach.

UNIT-III:

Digital Simulation of Transient Stability: Swing equation machine equations – Representation of loads – Alternate cycle solution method – Direct method of solution – Solution Techniques: Modified Euler method – RungeKutta method – Concept of multi machine stability..

UNIT-IV:

Effect of governor action and excite on power system stability effect of saturation, saliency & automatic voltage regulators on stability.

UNIT-V:

Excitation Systems : Rotating Self-excited Exciter with direct acting Rheostatic type voltage regulator – Rotating main and Pilot Exciters with Indirect Acting Rheostatic Type Voltage Regulator – Rotating Main Exciter, Rotating Amplifier and Static Voltage Regulator – Static excitation scheme – Brushless excitation system

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1201	
Course Title: POWER SYSTEM DYNAMICS & STABILITY	
CO-1	Able to determine the model of synchronous machines.
CO-2	Able to know the stability studies of synchronous machines.
CO-3	Able to get the knowledge of solution methods of transient stability.
CO-4	Able to know the effect of different excitation systems in power systems.

SYLLABUS: REAL TIME CONTROL OF POWER SYSTEMS (M17PS1202)

UNIT-I:

State Estimation: Different types of State Estimations, Theory of WLS state estimation, sequential and non-sequential methods to process measurements. Bad data Observability, Bad data detection, identification and elimination.

UNIT-II:

Security and Contingency Evaluation : Security concept, Security Analysis and monitoring, Contingency Analysis for Generator and line outages by iterative linear power flow method, Fast Decoupled model, and network sensitivity methods.

UNIT-III:

Computer Control of Power Systems: Need for real time and computer control of power systems, operating states of a power system, SCADA - Supervisory control and Data Acquisition systems implementation considerations, energy control centres, software requirements for implementing the above functions.

UNIT-IV:

Voltage Stability, voltage collapse, and voltage security, relation of voltage stability to rotor angle stability. Voltage stability analysis Introduction to voltage stability analysis `P-V" curves and `Q-V" curves, voltage stability in mature power systems, long-term voltage stability, power flow analysis for voltage stability, voltage stability static indices and Research Areas.

UNIT-V:

Application of AI and ANN in Power System: Basic concepts and definitions, algorithms for load flow, short term load forecasting, fault diagnosis and state estimation.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1202	
Course Title: REAL TIME CONTROL OF POWER SYSTEMS	
CO-1	Understand state estimation, security and contingency evaluation.
CO-2	Understand about Supervisory control and data acquisition.
CO-3	Real time software application to state estimation.
CO-4	Understand application of AI in power system.

SYLLABUS: ARTIFICIAL INTELLIGENCE TECHNIQUES (M17PS1203)

UNIT-I: Introduction to Neural Networks

Introduction, Humans and Computers, Biological Neural Networks, Historical development of neural network, Terminology and Topology, Biological and artificial neuron models, Basic learning laws

UNIT-II: Feed Forward Neural Networks

Introduction, Perceptron models: Discrete, continuous and multi-category, Training algorithms: Discrete and Continuous Perceptron Networks, Perceptron convergence theorem, Limitations and applications of the Perceptron model, Generalized delta learning rule, Feed forward recall and error back propagation training-Radial basis function algorithms-Hope field networks..

UNIT-III: Genetic algorithms& Modelling

Introduction-encoding-fitness function-reproduction operators-genetic operators-cross over and mutation-generational cycle-convergence of genetic algorithm

UNIT-IV: Classical and Fuzzy Sets

Introduction to classical sets - properties, operations and relations; Fuzzy sets, membership,Uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions. Fuzzy Logic System Components-Fuzzification, Membership value assignment, development of rule base and decision making system, defuzzification to crisp sets, defuzzification methods.

UNIT-V: Application of AI Techniques-load forecasting-load flow studies-economic load dispatch-load frequency control-reactive power control-speed control of dc and ac motors

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1203	
Course Title: ARTIFICIAL INTELLIGENCE TECHNIQUES	
CO-1	Understand neural networks and analyze different types of neural networks.
CO-2	Design training algorithms for neural networks.
CO-3	Develop algorithms using genetic algorithm for optimization.
CO-4	Analyze and design fuzzy logic systems.
CO-5	Apply AI Techniques in electrical engineering.

SYLLABUS: FLEXIBLE AC TRANSMISSION SYSTEMS (M17PS1204)

UNIT-I:

FACTS concepts, Transmission interconnections, power flow in an AC System, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, benefits from FACTS controllers.

UNIT-II:

Basic concept of voltage and current source converters, comparison of current source converters with voltage source converters. Static shunt compensation : Objectives of shunt compensation, midpoint voltage regulation, voltage instability prevention, improvement of transient stability, Power oscillation damping, methods of controllable var generation, variable impedance type static var generators, switching converter type var generators, hybrid var generators.

UNIT-III:

SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient stability enhancement and power oscillation damping, operating point control and summary of compensation control.

UNIT-IV:

Static series compensators: Concept of series capacitive compensation, improvement of transient stability, power oscillation damping, functional requirements. GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC), control schemes for GSC, TSSC and TCSC

UNIT-V:

Unified Power Flow Controller: Basic operating principle, conventional transmission control capabilities, independent real and reactive power flow control, comparison of the UPFC to series compensators and phase angle regulators.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1204	
Course Title:FLEXIBLE AC TRANSMISSION SYSTEMS	
CO-1	Know the performance improvement of transmission system with FACTS.
CO-2	Get the knowledge of effect of static shunt and series compensation.
CO-3	Know the effect of UPFC.
CO-4	Determine an appropriate FACTS device for different types of applications.

SYLLABUS: SMART GRID TECHNOLOGIES (M17PS1205)
(ELECTIVE-III)

UNIT-I:

Introduction to Smart Grid: Evolution of Electric Grid, Concept of Smart Grid, Definitions, Need of Smart Grid, Functions of Smart Grid, Opportunities & Barriers of Smart Grid, Difference between conventional & smart grid, Concept of Resilient &Self Healing Grid, Present development & International policies on Smart Grid. Case study of Smart Grid.

UNIT-II:

Smart Grid Technologies: Part 1: Introduction to Smart Meters, Real Time Prizing, Smart Appliances, Automatic Meter Reading(AMR), Outage Management System(OMS), Plug in Hybrid Electric Vehicles(PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation, Phase Shifting Transformers..

UNIT-III:

Smart Grid Technologies: Part 2: Smart Substations, Substation Automation, Feeder Automation. Geographic Information System(GIS), Intelligent Electronic Devices(IED) & their application for monitoring & protection, Smart storage like Battery, SMES, Pumped Hydro, Compressed Air Energy Storage, Wide Area Measurement System(WAMS), Phase Measurement Unit(PMU).

UNIT-IV:

Microgrids and Distributed Energy Resources: Concept of micro grid, need & applications of microgrid, formation of microgrid, Issues of interconnection, protection & control of microgrid. Plastic & Organic solar cells, Thin film solar cells, Variable speed wind generators, fuelcells, microturbines, Captive power plants, Integration of renewable energy sources..

UNIT-V:

Power Quality Management in Smart Grid: Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit. Information and Communication Technology for Smart Grid: Advanced Metering Infrastructure (AMI), Home Area Network (HAN), Neighborhood Area Network (NAN), Wide Area Network (WAN)

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1205	
Course Title: SMART GRID TECHNOLOGIES (ELECTIVE-III)	
CO-1	Understand smart grids and analyse the smart grid policies and developments in smart grids.
CO-2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc.
CO-3	Understand smart substations, feeder automation, GIS etc.
CO-4	Analyse micro grids and distributed generation systems.
CO-5	Analyse the effect of power quality in smart grid and to understand latest developments in ICT for smart grid

SYLLABUS: POWER QUALITY (M17PS1206)
(ELECTIVE-III)

UNIT-I: Introduction

Overview of Power Quality - Concern about the Power Quality - General Classes of Power Quality Problems – Transients -Long-Duration Voltage Variations - Short-Duration Voltage Variations - Voltage Unbalance - Waveform Distortion - Voltage fluctuation - Power Frequency Variations - Power Quality Terms - Voltage Sags and Interruptions - Sources of Sags and Interruptions – Nonlinear loads.

UNIT-II: Transient over Voltages

Source of Transient Over Voltages - Principles of Over Voltage Protection - Devices for Over Voltage Protection - Utility Capacitor Switching Transients - Utility Lightning Protection – Load Switching Transient Problems - Computer Tools for Transient Analysis

UNIT-III: Harmonic Distortion and solutions

Voltage vs. Current Distortion - Harmonics vs. Transients - Power System Quantities under Nonsinusoidal Conditions - Harmonic Indices – Sources of harmonics - Locating Sources of Harmonics – System Response Characteristics - Effects of Harmonic Distortion – Inter harmonics - Harmonic Solutions Harmonic Distortion Evaluation - Devices for Controlling Harmonic Distortion - Harmonic Filter Design - Standards on Harmonics

UNIT-IV: Long Duration Voltage Variations

Principles of Regulating the Voltage - Device for Voltage Regulation - Utility Voltage Regulator Application - Capacitor for Voltage Regulation - End-user Capacitor Application – Regulating Utility Voltage with Distributed Resources – Flicker

UNIT-V: Distributed Generation and Power Quality

Resurgence of Distributed Generation - DG Technologies - Interface to the Utility System Power Quality Issues - Operating Conflicts - DG on Low Voltage Distribution Networks - Interconnection standards - Wiring and Grounding - Typical Wiring and Grounding Problems - Solution to Wiring and grounding Problems

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1206	
Course Title: POWER QUALITY (ELECTIVE-III)	
CO-1	Have the knowledge on causes of power quality, power quality parameters.
CO-2	Understand sources of transient over voltages and providing protection to transient over voltages.
CO-3	Understand effects of harmonics, sources of harmonics and harmonic minimization.
CO-4	Analyze long duration voltage variations and regulation of voltage variations.
CO-5	Describe power quality aspects in distributed generation and develop solutions to wiring and grounding problems.

SYLLABUS: ADVANCED POWER SYSTEM PROTECTION

(M17 PS1207)

(ELECTIVE-III)

UNIT-I:

Static Relays classification and Tools : Comparison of Static with Electromagnetic Relays, Basic classification, Level detectors and Amplitude and phase Comparators – Duality – Basic Tools – Schmitt Trigger Circuit, Multivibrators, Square wave Generation – Polarity detector – Zero crossing detector – Thyristor and UJT Triggering Circuits. Phase sequence Filters – Speed and reliability of static relays.

UNIT-II:

Amplitude and Phase Comparators (2 Input) : Generalized equations for Amplitude and Phase comparison – Derivation of different characteristics of relays – Rectifier Bridge circulating andopposed voltage type amplitude comparators–Averaging & phase splitting type amplitude comparators – Principle of sampling comparators. Phase Comparison: Block Spike and phaseSplitting Techniques – Transistor Integrating type, phase comparison, Rectifier Bridge TypeComparison– Vector product devices.

UNIT-III:

Static over current (OC) relays – Instantaneous, Definite time, Inverse time OC Relays, static distance relays, static directional relays, static differential relays, measurement of sequence impedances in distance relays, multi input comparators, elliptic & hyperbolic characteristics, switched distance schemes, Impedance characteristics during Faults and Power Swings,

UNIT-IV:

PILOT Relaying schemes: Wire pilot protection: circulating current scheme – balanced voltage scheme – translay scheme – half wave comparison scheme - carrier current protection: phase comparison type – carrier aided distance protection – operational comparison of transfer trip and blocking schemes – optical fibre channels.

UNIT-V:

Microprocessor based relays andNumerical Protection: Introduction – over current relays – impedance relay – directional relay – reactance relay. Numerical Protection: Introduction - numerical relay - numerical relaying algorithms – mannmorrison technique - Differential equation technique and discrete fourier transform technique - numerical over current protection - numerical distance protection.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1207	
Course Title: ADVANCED POWER SYSTEM PROTECTION (ELECTIVE-III)	
CO-1	Know the classifications and applications of static relays.
CO-2	Understand the application of comparators.
CO-3	Understand the static version of different types of relays.
CO-4	Understand the numerical protection techniques.

SYLLABUS: EHVAC TRANSMISSION (M17PS1208)
(ELECTIVE-III)

UNIT-I:

E.H.V. A.C. Transmission , line trends and preliminary aspects ,standard transmission voltages – power handling capacities and line losses – mechanical aspects. Calculation of line resistance and inductance: resistance of conductors, temperature rise of conductor and current carrying capacity. Properties of bundled conductors and geometric mean radius of bundle, inductance of two conductor lines and multi conductor lines, Maxwell"s coefficient matrix. Line capacitance calculation.capacitance of two conductor line, and capacitance of multi conductor lines, potential coefficients for bundled conductor lines, sequence inductances and capacitances and diagonalization.

UNIT-II:

Calculation of electro static field of AC lines - Effect of high electrostatic field on biologicalorganisms and human beings. Surface voltage Gradient on conductors, surface gradient on twoconductor bundle and cosine law, maximum surface voltage gradient of bundle with more than 3subconductors, Mangolt formula.

UNIT-III:

Corona : Corona in EHV lines – corona loss formulae – attenuation of traveling waves due tocorona – Audio noise due to corona, its generation, characteristics and limits, measurement of audio noise.

UNIT-IV:

Power Frequency voltage control : Problems at power frequency, generalized constants, No load voltage conditions and charging currents, voltage control using synchronous condenser, cascade connection of components : Shunt and series compensation, sub synchronous resonance in series – capacitor compensated lines

UNIT-V:

Static reactive compensating systems: Introduction, SVC schemes, Harmonics injected into network by TCR, design of filters for suppressing harmonics injected into the system.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1208	
Course Title: EHVAC TRANSMISSION (ELECTIVE-III)	
CO-1	Calculate the transmission line parameters.
CO-2	Calculate the field effects on EHV and UHV AClines.
CO-3	Determine the corona, RI and audible noise in EHV and UHVlines.
CO-4	Analyze voltage control and compensation problems in EHV and UHV transmission systems

POWER SYSTEM DE REGULATION (M17PS1209)
(ELECTIVE-IV)

UNIT-I:

Need and conditions for deregulation. Introduction of Market structure, Market Architecture,Spot market, forward markets and settlements. Review of Concepts marginal cost of generation,least-costoperation, incrementalcost ofgeneration.Power System Operation.

UNIT-II:

Electricity sector structures and Ownership /management, the forms of Ownership and management. Different structure model like Monopoly model, Purchasing agency model, wholesale competition model, Retail competition model.

UNIT-III:

Framework and methods for the analysis of Bilateral and pool markets, LMP based markets, auction models and price formation, price based unit commitment, country practices

UNIT-IV:

Transmission network and market power. Power wheeling transactions and marginal costing, transmission costing. Congestion management methods- market splitting, counter-trading; Effect of congestion on LMPs- country practices

UNIT-V:

Ancillary Services and System Security in Deregulation. Classifications and definitions, AS management in various markets- country practices. Technical, economic, & regulatory issues involved in the deregulation of the power industry.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1209	
Course Title: POWER SYSTEM DEREGULATION (ELECTIVE-IV)	
CO-1	Understand of operation of deregulated electricity market systems
CO-2	Typical issues in electricity markets
CO-3	To analyze various types of electricity market operational and control issues using new mathematical models.

SYLLABUS: HIGH VOLTAGE TESTING TECHNIQUES (M17PS1210)
(ELECTIVE-IV)

UNIT-I:

Non Destructive Testing Techniques : Measurement of DC Resistivity – Dielectric loss and dielectric constant of insulating materials – Schering bridge method – Transformer ratio arm bridge for high voltage and high current applications – null detectors

UNIT-II:

High Voltage Testing of Power Apparatus: Need for testing standards – Standards for porcelain/Glass insulators-Classification of porcelain/glass insulator tests – Tests for cap and pin porcelain/Glass insulators

UNIT-III:

High voltage AC testing methods-Power frequency tests-Over voltage tests on insulators, Isolators, Circuit Breakers and power cables. Artificial Contamination Tests : Contamination flashover phenomena-Contamination Severity-Artificial contamination tests-Laboratory Testing versus in-Service Performance-Case study.

UNIT-IV:

Impulse Testing: Impulse testing of transformers, insulators, Surge diverters, Bushings, cables, circuit breakers.

UNIT-V:

Partial Discharge Measurement: PD equivalent model-PD currents-PD measuring circuits Straight and balanced detectors-Location and estimation of PD in power apparatus-PD measurement by non electrical methods-Calibration of PD detectors. RIV Measurements: Radio Interference – RIV – Measurement of RI and RIV in laboratories and in field. Different test arrangements and their limitations.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1210	
Course Title: HIGH VOLTAGE TESTING TECHNIQUES (ELECTIVE-IV)	
CO-1	Understand different testing procedures on electrical a) Insulating materials b) Insulation Systems. c) Power apparatus.
CO-2	Learn the different testing techniques adopted on electrical power apparatus

SYLLABUS: POWER SYSTEM TRANSIENTS (M17 PS 1211) (ELECTIVE-IV)

UNIT-I:

Basic Concepts and Simple Switching Transients;- Switching an LR,LC,RLC circuits Transients Analysis of Three-Phase power Systems: – Symmetrical components in three-phase Systems, Sequence Components for Unbalanced Network Impedances, the Sequence Networks, analysis of Unsymmetrical Three-Phase Faults-single line-to-Ground Fault, Three phase to ground fault.

UNIT-II:

Travelling Waves:- Velocity of Travelling waves and Characteristic Impedance, Energy Contents of Travelling Waves, Attenuation and Distortion of Electromagnetic Waves, telegraph equations-lossless line, distortion less line, Reflection and Refraction of Travelling Waves, Reflection of Travelling Waves against Transformer-and-Generator-windings, the Origin Transient Recovery voltages, bewley-lattice diagram. travelling waves and multi conductor system..

UNIT-III:

Switching Transients: arc interruption in circuit breaker , transient recovery voltage, arc-circuit interaction, interruption of capacitive currents, interruption of inverse currents, interruption of fault current in transmission line and transformers.

UNIT-IV:

Power System Transient Recovery Voltages:- Characteristics of the Transient Voltage- Short circuit test duties based on IEC 60056 (1987),ANSI/IEEE Standards, the Harmonization between IEC and ANSI/IEEE Standards with respect to Short-circuit Test duties, transient recovery voltage for Different types of faults.

UNIT-V:

Lightning –Induced Transients:- Mechanism of Lightning, wave shape of the lightning current, Direct lighting Stroke to transmission line towers, direct lightening stroke to a line, lightning protection scheme. Numerical simulation of electrical transients, The Electromagnetic Transient Program, principles of numerical techniques used in transient simulation

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1211	
Course Title: POWER SYSTEM TRANSIENTS (ELECTIVE-IV)	
CO-1	Understand the severity of over voltages due to faults on a given power system.
CO-2	To limit the effects of lightning over voltages in power systems.
CO-3	Understand the various transient over voltages and their effects on power system.

SYLLABUS: VOLTAGE STABILITY (M17PS1212)
(ELECTIVE-IV)

UNIT-I:

Reactive Power flow and voltage stability in power systems: Physical relationship indicating dependency of voltage on reactive power flow - reactive power, transient stability; Q V curve; definition of voltage stability, voltage collapse and voltage security. Voltage collapse phenomenon, Factors of voltage collapse, effects of voltage collapse, voltage collapse analysis.

UNIT-II:

Power system loads: Load characteristics that influence voltage stability such as – Discharge lighting, Induction motor, Air conditioning and heat pumps, Electronic power supplies, Over Head lines and cables.

UNIT-III:

Reactive Power compensation: Generation and absorption of reactive power – Reactive power compensators & voltage controllers: - shunt capacitors, synchronous phase modifier – static VAR system – on load tap changing transformer, booster transformers.

UNIT-IV:

Voltage stability static indices: Development of voltage collapse index – power flow studies –singular value decomposition – minimum singular value of voltage collapse – condition numberas voltagecollapse index.

UNIT-V:

Voltage stability margins & Improvement of voltage stability: Stability margins, voltage stability margin of un compensated and compensated power system. Dynamic voltage stability – voltage security, Methods of improving voltage stability and its practical aspects.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1212	
Course Title: VOLTAGE STABILITY (ELECTIVE-IV)	
CO-1	**Interpret** the importance of reactive power and its compensation in transmission lines.
CO-2	**Summarize** the characteristics of TCR, TSR, FC-TCR and TSC.
CO-3	**Examine** the functional operation of SVC, STATCOM, TCSC & SSSC and their comparison.
CO-4	**Inspect** SVC &STATCOM for their applications in improvement of transient stability, Steady-State Power- Transfer Capacity, and SSR mitigation.
CO-5	**Inspect** TCSC & SSSC for their applications in improvement of system stability limit**,** system damping, Power flow control, and SSR mitigation.

SYLLABUS: POWER SYSTEMS LABORATORY (M17PS1213)

List of Experiments:

1. Determination of Sequence Impendence of an Alternator by direct method.
2. Determination of Sequence impedance of an Alternator by fault Analysis.
3. Measurement of sequence impedance of a three phase transformer.
   (a). by application of sequence voltage.
   (b). using fault analysis
4. Power angle characteristics of a salient pole Synchronous Machine.
5. Poly-phase connection on three single phase transformers and measurement of phase displacement.
6. Determination of equivalent circuit of 3-winding Transformer.
7. Measurement of ABCD parameters on transmission line model.
8. Performance of long transmission line without compensation.
9. Study of Ferranti effect in long transmission line.
10. Performance of long transmission line with shunt compensation..

Course Outcomes for First Year Second Semester Course	
Course Code: M17 PS 1213	
Course Title:POWER SYSTEMS LABORATORY	
CO-1	After the Completion of lab they will understand procedure for determination of various parameters used in power system as well as performance of transmission line.

Regulation: R17			**M.Tech. III - Semester**			
ELECTRICAL & ELECTRONICS ENGINEERING (POWER SYSTEM AND AUTOMATION) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2020-21 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17PS 2101	Comprehensive Viva-Voce	Viva-Voce	2	50	-	50
M17PS 2102	Seminar-I	Oral Presentation	2	50	-	50
M17PS 2103	Project Work Part-I	Review	16	50	-	50
Total			**20**	**150**	**-**	**150**

1. The Viva-Voce for the Comprehensive Viva-Voce and Seminar-I shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.
2. Candidates can do their Project Work Part-I&II work within the department or in any industry/research organization for two semesters (i.e. 3rd and 4th semesters). In case of thesis done in an industry/research organization, one advisor (Guide) should be from the department and one advisor (Co-Guide) should be from the industry/research organization.
3. The Project Work Part-I should be submitted at the end of 3rd Semester and it will be evaluated through Review by a committee consisting of Head of the Department, PG coordinator and Project guide. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively

Regulation: R17			M.Tech. IV - Semester			
ELECTRICAL & ELECTRONICS ENGINEERING (POWER SYSTEM AND AUTOMATION) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2020-21 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17 PS 2201	Seminar-II	Oral presentation	2	50	-	50
M17 PS 2202	Project Work Part-II	Viva-voce	18		100	100
Total			**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.
2. A publication of a paper on the thesis work in a National/International Journal at the end of 4 th semester is mandatory for the submission of thesis work.
3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20 and 20 Marks by the members respectively.

INFORMATION TECHNOLOGY

Regulation: R17					M.Tech. I - Semester				
INFORMATION TECHNOLOGY(INFORMATION TECHNOLOGY) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of the Subject**	**C**	**Cr**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17 IT1101	Advanced Data Structures	ES	3	3	1	--	30	70	100
M17 IT1102	Distributed Systems	ES	3	3	1	--	30	70	100
M17 IT1103	Software Requirements And Estimation	ES	3	3	1	--	30	70	100
M17 IT1104	Data Mining And Knowledge Discovery	ES	3	3	1	--	30	70	100
M17 IT1105	Advanced Computer Networks	ES	3	3	1	--	30	70	100
M17 IT1106	Web Technologies	ES	3	3	1	--	30	70	100
M17 IT1107	IT LAB 1	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

SYLLABUS: ADVANCED DATA STRUCTURES (M17 IT1101)

UNIT I:

Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists Algorithms. Stacks and Queues: Algorithm Implementation using Linked Lists.

UNIT II:

Searching-Linear and Binary Search Methods. Sorting-Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort. Trees-Binary trees, Properties, Representation and Traversals (DFT, BFT),Expression Trees(Infix, prefix, postfix). Graphs-Basic Concepts, Storage Structures and Traversals.

UNIT III:

Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing.

UNIT IV:

Priority queues-Definition, ADT, Realising a Priority Queue Using Heaps, Definition, Insertion, Deletion. Search Trees-Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion, Deletion.

UNIT V:

Search Trees-AVL Trees, Definition, Height of AVL Tree, Operations-, Insertion, Deletion and Searching. Search Trees-Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1101	
Course Title: ADVANCED DATA STRUCTURES	
CO-1	Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class.
CO-2	Master a variety of advanced abstract data type (ADT) and data structures and their implementations. 3. Master different algorithm design techniques.
CO-3	Ability to apply and implement learned algorithm design techniques and data structures to solve problems.

SYLLABUS: DISTRIBUTED SYSTEMS (M17 IT 1102)

UNIT-I:

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. System Models: Introduction, Architectural Models-Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models-Interaction Model, Failure Model, Security Model.

UNIT-II:

Inter-process Communication: Introduction, The API for the Internet Protocols- The Characteristics of Inter-process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication-IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

UNIT-III:

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects-Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT-IV:

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads – Address Space, Creation of a New Process, Threads.

UNIT-V:

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays. Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication. Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1102	
Course Title: DISTRIBUTED SYSTEMS	
CO-1	Explain various architectures used to design distributed systems, such as client-server and Peer-to-peer.
CO-2	Build distributed systems using various inter-process communication techniques, such as remote method invocation, remote events, and tuple spaces.
CO-3	Build distributed systems using various techniques for tolerating partial failures, such as leasing and replication.
CO-4	Build distributed systems using various inter process coordination techniques, such as distributed mutual exclusion, distributed monitors, and tuple spaces.
CO-5	Explain various distributed algorithms, such as logical clocks and leader election.
CO-6	Analyze and explain current distributed systems research literature.

SYLLABUS: SOFTWARE REQUIREMENTS AND ESTIMATION (M17 IT 1103)

UNIT I:

SoftwareRequirements: What and Why Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT II:

Software Requirements Engineering : Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality Software Requirements Modeling: Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT III:

Software Requirements Management: Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation

UNIT IV:

Software Estimation: Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation. Size Estimation: Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT V:

Effort, Schedule and Cost Estimation: What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC‟s COCOMO II, SLIM (Software Life Cycle Management) Tools

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1103	
Course Title: SOFTWARE REQUIREMENTS AND ESTIMATION	
CO-1	Understand what software engineering is and why it is important.
CO-2	Understand the concept of software processes and software process models.
CO-3	Understand the principles of object orientation.
CO-4	Understand the principle of software development on reusable technology.
CO-5	Understand the type of software requirements (Functional & Non Functional).
CO-6	Understand that the effective requirements management can be accomplished only by an effective software team.

SYLLABUS: DATAMINING AND KNOWLEDGE DISCOVERY (M17 IT 1104)

UNIT I:

Introduction to Data mining, types of Data, Data Quality, Data Processing, Measures of Similarity and Dissimilarity, Exploring Data: Data Set, Summary Statistics, Visualization, OLA Pand multi-dimensional data analysis.

UNIT II: Classification: Basic Concepts, Decision Trees and model evaluation: General approach for solving a classification problem, Decision Tree induction, Model over fitting: due to presence of noise, due to lack of representation samples, Evaluating the performanceof classifier. Nearest Neighborhood classifier, Bayesian Classifier, Support vector Machines: Linear SVM, Separable and Non Separablecase.

UNIT III: Association Analysis: Problem Definition, Frequent Item-set generation, rule generation, compact representation of frequent item sets, FP-Growth Algorithms. Handling Categorical , Continuous attributes, Concept hierarchy, Sequential , Sub graph patterns

UNIT IV: Clustering: Over view, K-means, Agglomerative Hierarchical clustering, DBSCAN, Cluster evaluation: overview, Unsupervised Cluster Evaluation using cohesion and separation, using proximity matrix, Scalable Clustering algorithm

UNIT V: Web data mining: Introduction, Web terminology and characteristics, Web content mining, Web usage mining, web structure mining, Search Engines : Characteristics, Functionality, Architecture, Ranking of WebPages, Enterprise search

Course Outcomes for First Year First Semester Course	
Course Code:M17 IT 1104	
Course Title: DATAMINING AND KNOWLEDGE DISCOVERY	
CO-1	At the end of the course the student will be able to
CO-2	Explain the fundamental concepts of Data mining & Knowledge discovery.
CO-3	Understand the data preprocessing techniques.
CO-4	Understand Machine Learning algorithms and strategies to discovery and to deploy the discovered results.

ADVANCED COMPUTER NETWORKS (M17 IT 1105)

UNIT-I:

Network layer: Network Layer design issues: store-and forward packet switching, services provided transport layers, implementation connection less services, implementation connection oriented services, comparison of virtual –circuit and datagram subnets. Routing Algorithm –shortest path routing, flooding, distance vector routing, link state routing, Hierarchical routing, Broadcast routing, Multicasting routing, routing for mobiles Hosts, routing in Adhoc networks-congestion control algorithms-Load shedding, Congestion control in Data gram Subnet.

UNIT-II:

IPV4 Address address space, notations, classful addressing, classless addressing network addressing translation(NAT) , IPV6 Address structure address space, Internetworking need for network layer internet as a data gram, internet as connection less network. IPV4 datagram, Fragmentation, checksum, options. IPV6 Advantages, packet format, extension Headers, Transition form IPV4 to IPV6

UNIT–III:

Process to process delivery: client/server paradigm, multiplexing and demultiplexing connectionless versus connection oriented services, reliable versus reliable. UDP: well known ports for UDP, user data gram, check sum, UDP operation, and uses of UDP TCP: TCP services, TCP features, segment, A TCP connection, Flow control, error control, congestion control. SCTP: SCTP services SCTP features, packet format, An SCTP association, flow control, error control. Congestion control: open loop congestion control, closed loop congestion control, Congestion control in TCP, frame relay, QUALITY OF SERVICE: flow characteristics, flow classes TECHNIQUES TO IMPROVE QOS: scheduling, traffic shaping, resource reservation, admission control.

UNIT–IV:

Multimedia: introduction digital a audio , Audio compression, streaming audio, internet radio, voice over IP, introduction to video, video compression, video on demand, the MB one the multicast back bone

UNIT–V: : Emerging trends Computer Networks: Mobile Ad hoc networks: applications of Ad hoc networks, challenges and issues in MANETS,MAC layers issues, routing protocols in MANET, transport layer issues, Ad Hoc networks security. Wireless sensors networks: WSN functioning, operation system support in sensor devices, WSN Characteristics, sensor network operation, sensor Architecture: cluster management; Wireless mesh networks WMN design, Issues in WMNs;

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1105	
Course Title: ADVANCED COMPUTER NETWORKS	
CO-1	To identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality.
CO-2	To understand the principles and functionality of mobile IP, explaining its concretization in IPv6; to understand the needs of optimization of the mobility mechanisms and description of some extensions that aim to reduce handover latency and requirements from terminals.
CO-3	To recognize the need for service integration and discuss how it can be accomplished;
CO-4	To explain and exemplify current QoS architectures and mechanisms, and the QoS support challenges in future networks.

SYLLABUS: WEB TECHNOLOGIES (M17 IT 1106)

UNIT-I:

Java script : The Basic of Java script: Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions

UNIT-II:

XML: Document type Definition, XML schemas, Document object model, SLT, DOM and SAX Approaches, AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX.

UNIT-III:

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script. Working with variables and constants: Using variables, Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as My SQL.

UNIT-IV:

PERL: Introduction to PERL, Operators and if statements, Program design and control structures, Arrays, Hashs and File handling, Regular expressions, Subroutines, Retrieving documents from the web with Perl.

UNIT-V:

RUBY: Introduction to Ruby, Variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching. Overview of Rails.

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1106	
Course Title: WEB TECHNOLOGIES	
CO-1	Develop a dynamic webpage by the use of java script and DHTML.
CO-2	Write a well formed / valid XML document.
CO-3	Connect to database and perform data manipulations.
CO-4	Write programs in PERL.
CO-5	Develop Ruby applications.

SYLLABUS: IT LAB 1(M17 IT 1107)

1. Write a c program to implement one to one chat application using sockets?
2. Write a c program to implement redundancy check using CRC?
3. Write a java program to implement simulation of sliding window protocol?
4. Write a java program to get the MAC or Physical address of the system using Address Resolution Protocol?
5. By using Data mining tool Demonstration of preprocessing on dataset student.arff?
6. By using Data mining tool Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. By using Data mining tool Demonstration of Association rule process on dataset test.arff using apriori algorithm?
8. By using Data mining tool Demonstration of classification rule process on dataset employee.arff using naïve baye‟s algorithm?
9. By using Data mining tool Demonstration of clustering rule process on dataset iris.arff using simple k-means algorithms.
10. To perform various Recursive & Non-Recursive operations on Binary Search Tree
11. To implement BFS & DFS for a Graph
12. To implement Merge & Heap Sort of given elements
13. To perform various operations on AVL trees.
14. To implement Krushkal‟s algorithm to generate a min-cost spanning tree
15. To implement Prim‟s algorithm to generate a min-cost spanning tree
16. To implement functions of Dictionary using Hashing

Course Outcomes for First Year First Semester Course	
Course Code: M17 IT 1107	
Course Title: IT LAB 1	
CO-1	Student able to execute programmers' in computer networks.
CO-2	Student able to know use of different data mining tools.
CO-3	Student able to execute programmers' on data structures.

Regulation: R17				M.Tech. II - Semester					
INFORMATION TECHNOLOGY(INFORMATION TECHNOLOGY) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of theSubject**	**C**	**Cr**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17 IT 1201	Advanced Unix Programming	ES	3	3	1	- -	30	70	100
M17 IT 1202	Cyber Security	ES	3	3	1	- -	30	70	100
M17 IT 1203	Big Data Analytics	ES	3	3	1	- -	30	70	100
M17 IT 1204	Cloud Computing	ES	3	3	1	- -	30	70	100
#ELE-1	Elective-I	ES	3	3	1	- -	30	70	100
#ELE-2	Elective-II	ES	3	3	1	- -	30	70	100
M17 IT 1213	ITLAB2	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	CourseCode	Course
#ELE-1	M17 IT1205	Adhoc& Sensor Networks
	M17 IT1206	Semantic Web services
	M17 IT1207	Principles Of Programming Languages
	M17 IT1208	Internet Of Things
#ELE-2	M17 IT1209	Machine Learning
	M17 IT1210	Information Retrieval System
	M17 IT1211	Image Processing & Pattern Recognition
	M17 IT1212	Software Testing Methodologies

SYLLABUS: ADVANCED UNIX PROGRAMMING (M17 IT 1201)

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands

UNIT-II

The File system –The Basics of Files-What‟s in a File-Directories and File Names Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands Command Arguments and Parameters-Program Output as Arguments-Shell Variables--More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command Branching Control Structures-Loop Control Structures-The Continue and Break Statement The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<

Course Outcomes for First Year Second Semester Course	
Course Code:M17 IT 1201	
Course Title:ADVANCED UNIX PROGRAMMING	
CO-1	Able to understand and reason out the working of Unix Systems.
CO-2	Able to build an application/service over a Unix system.
CO-3	Describe the architecture and features of UNIX Operating System and distinguish it from
CO-4	Other Operating System Understanding.
CO-5	Demonstrate UNIX commands for file handling and process control Applying.
CO-6	Write Regular expressions for pattern matching and apply them to various filters for a

SYLLABUS: CYBER SECURITY (M17 IT 1202)

UNITI:

Introduction: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II:

Conventional Encryption: Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC

UNIT III:

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat‟s and Euler‟s Theorems, The Chinese Remainder theorem, Discrete logarithms Public key: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT IV:

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET) Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT V:

Intrusion Detection: Intruders, Intrusion Detection systems, Password Management. Malicious Software: Viruses and related threats & Countermeasures. Fire walls: Firewall Design principles, Trusted Systems.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1202	
Course Title: CYBER SECURITY	
CO-1	Will have knowledge and understanding of: Classical encryption techniques, Block ciphers and the Data Encryption Standard Key management, Public key cryptosystems, Message authentication, Hash functions and algorithms,
CO-2	Will have understanding of: Digital signatures and authentication protocols, Network security practice, Applications, E
CO-3	Will develop their skills in: The programming of symmetric and/or asymmetric ciphers and their use in the networks.
CO-4	Will learn protocols used in Web Security and Transport layer Security

SYLLAUS: BIG DATA ANALYTICS (M17 IT 1203)

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing Map Reduce Programs: A Weather Dataset, Understanding Hadoop API for Map Reduce Framework (Old and New), Basic programs of Hadoop Map Reduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom compare

UNIT-V

Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT1203	
Course Title: BIG DATA ANALYTICS	
CO-1	Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data.
CO-2	Collect, manage, store, query, and analyze various form of big data
CO-3	Gain hands-on experience on large-scale analytics tools to solve some open big data problems
CO-4	Understand the impact of big data for business decisions and strategy.

SYLLABUS: CLOUD COMPUTING (M17 IT 1204)

UNIT I:

Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing Parallel and Distributed Systems: introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, and model concurrency with Petri Nets.

UNIT II:

Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing Cloud Computing : Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

UNIT III:

Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization-full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feed back control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

UNIT IV:

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2) Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

UNIT V:

Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04,Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book 1) Google: Google App Engine, Google Web Toolkit (Text Book 2) Microsoft: Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2)

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1204	
Course Title: CLOUD COMPUTING	
CO-1	Understanding the key dimensions of the challenge of Cloud Computing.
CO-2	Assessment of the economics, financial, and technological implications for selecting cloud computing for own organization.
CO-3	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.
CO-4	Assessment of own organizations‟ needs for capacity building and training in cloud computing-related IT areas.

SYLLABUS: ADHOC& SENSOR NETWORKS (M17 IT 1205)
(ELECTIVE-I)

UNIT I:

Introduction to AdHoc Wireless Networks

Cellular and Ad Hoc Wireless Networks, Characteristics of MANETs, Applications of MANETs, Issues and Challenges of MANETs, Ad Hoc Wireless Internet, MAC protocols for Ad hoc Wireless Networks-Issues, Design Goals and Classifications of the MAC Protocols

UNIT II:

Routing Protocols for Ad Hoc Wireless Networks

Issues in Designing a Routing Protocol, Classifications of Routing Protocols, Topology-based versus Position-based Approaches, Issues and design goals of a Transport layer protocol, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks, Solutions for TCP over Ad Hoc Wireless Networks, Other Transport layer protocols.

UNIT III:

Security protocols for Ad hoc Wireless Networks

Security protocols for Ad hoc Wireless Networks Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks, Cooperation in MANETs, Intrusion Detection Systems.

UNIT IV:

Basics of Wireless Sensors and Applications

The Mica Mote, Sensing and Communication Range, Design Issues, Energy Consumption, Clustering of Sensors, Applications, Data Retrieval in Sensor Networks-Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNITV:

Security in WSNs

Security in WSNs, Key Management in WSNs, Secure Data Aggregation in WSNs, Sensor Network Hardware-Components of Sensor Mote, Sensor Network Operating Systems– TinyOS, LA-TinyOS, SOS, RETOS, Imperative Language-nesC, Dataflow style language: Tiny GALS, Node-Level Simulators, NS-2 and its sensor network extension, TOSSIM.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1205	
Course Title: ADHOC & SENSOR NETWORKS (ELECTIVE-I)	
CO-1	Students will be able to describe the unique issues in ad-hoc/sensor networks. This will be accessed through assignments and labs.
CO-2	Students will be able to describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks. This will be assessed through assignments, and classroom interaction.
CO-3	Students will be able to discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks. This will be assessed through assignments, labs, and classroom interaction.
CO-4	Students will be able to build and configure a test bed for a sensor network. This will be assessed through labs.
CO-5	Students will be able to describe and implement protocols on a sensor test bed network. This will be assessed through assignments, labs, and classroom interaction.

SYLLABUS: SEMANTIC WEB SERVICES (M17 IT 1206) (ELECTIVE-I)

UNIT I:

Web Intelligence: Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today"s Web, The Next Generation Web, Machine Intelligence, Artifical Intelligence, Ontology, Inference engines, Software Agents, Berners Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT II:

Knowledge Representation for the Semantic Web Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT III:

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines..

UNIT IV:

Semantic Web Applications, Services and Technology: Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT V:

Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features

Course Outcomes for First Year Second Semester Course	
Course Code:M17 IT 1206	
Course Title: SEMANTIC WEB SERVICES (ELECTIVE-I)	
CO-1	Understand the rationale behind Semantic Web.
CO-2	Model on topologies using Resource Description Framework (RDF).
CO-3	Design RDF Schemas for on tologies.
CO-4	Model and design on tologies using Web Ontology Language (OWL)
CO-5	Query on tologies using SPARQL.
CO-6	Understand and reflect on the principles of Ontology Engineering.
CO-7	Make an association between Semantic web and Web 2.0.
CO-8	Apply Semantic web technologies to real world applications.

SYLLABUS: PRINCIPLES OF PROGRAMMING LANGUAGES (M17 IT 1207) (ELECTIVE-I)

UNIT I:

Syntax and semantics: Evolution of programming languages, describing syntax, context, free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive - decent bottom - up parsing

UNIT II:

Data, data types, and basic statements: Names, variables, binding, type checking, scope, scope rules, lifetime and garbage collection, primitive data types, strings, array types, associative arrays, record types, union types, pointers and references, Arithmetic expressions, overloaded operators, type conversions, relational and boolean expressions , assignment statements , mixed mode assignments, control structures – selection, iterations, branching, guarded Statements

UNIT III:

Subprograms and implementations: Subprograms, design issues, local referencing, parameter passing, overloaded methods, generic methods, design issues for functions, semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping

UNIT IV:

Object-orientation, concurrency, and event handling: Object – orientation, design issues for OOP languages, implementation of object, oriented constructs, concurrency, semaphores, Monitors, message passing, threads, statement level concurrency, exception handling, event handling

UNIT V:

Functional programming languages: Introduction to lambda calculus, fundamentals of functional programming languages, Programming with Scheme, – Programming with ML, Logic programming languages: Introduction to logic and logic programming, –Programming with Prolog, multi - paradigm languages

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1207	
Course Title: PRINCIPLES OF PROGRAMMING LANGUAGES (ELECTIVE-I)	
CO-1	Understand the fundamental principles underlying various programming languages.
CO-2	Understand the basic algorithms in implementing simple programming languages.
CO-3	Understand some principles in the design of programming languages.

INTERNET OF THINGS
(M17 IT 1208)
(ELECTIVE-I)

UNIT I:

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples OF IoTs, Design Principles For Connected Devices Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT II:

Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations ,Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT III:

Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT IV:

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT V:

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology ,Sensing the World.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1208	
Course Title: INTERNET OF THINGS (ELECTIVE-I)	
CO-1	Interpret the vision of IoT from a global context.
CO-2	Determine the Market perspective of IoT.
CO-3	Compare and Contrast the use of Devices, Gateways and Data Management in IoT
CO-4	Implement state of the art architecture in IoT.
CO-5	Illustrate the application of IoT in Industrial Automation and identify Real World Design constraints.

SYLLABUS: MACHINE LEARNING (M17 IT 1209)
(ELECTIVE-II)

UNIT-I:

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation

UNIT-II:

Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT-III:

Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT-IV:

Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. Distance Based Models: Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering

UNIT-V:

Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1209	
Course Title: MACHINE LEARNING (ELECTIVE-II)	
CO-1	Develop an appreciation for what is involved in learning from data
CO-2	Understand a wide variety of learning algorithms
CO-3	Understand how to apply a variety of learning algorithms to data.
CO-4	Understand how to perform evaluation of learning algorithms and model selection.

SYLLABUS: INFORMATION RETRIEVAL SYSTEM (M17 IT 1210)
(ELECTIVE-II)

UNIT I:

Introduction to Information storage and retrieval systems: Domain Analysis of IR systems, IR and other types of Information Systems, IR System Evaluation Introduction to Data structures and algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms.

UNIT II:

Inverted Files and Signature Files: Introduction, Structures used in Inverted Files, Building an Inverted file using a sorted array, Modifications to the Basic Techniques. Signature Files: Concepts of Signature files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT III:

New Indices for Text, Lexical Analysis and Stop lists: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, Algorithms on the PAT Trees, Building PAT Trees as PATRICA Trees, PAT representation as Arrays. Stop lists.

UNIT IV:

Stemming Algorithms and Thesaurus Construction: Types of Stemming algorithms, Experimental Evaluations of Stemming, Stemming to Compress Inverted Files. Thesaurus Construction: Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri..

UNIT V:

String Searching Algorithms: Introduction, Preliminaries, The Naive Algorithm, The Knutt Morris-Pratt Algorithm, The Boyer-Moore Algorithm, The Shift-Or Algorithm, The Karp Rabin Algorithm.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1210	
Course Title: INFORMATION RETRIEVAL SYSTEM (ELECTIVE-II)	
CO-1	Identify Data Base Management systems and data ware houses
CO-2	Use knowledge of data structures and indexing methods in information retrieval Systems
CO-3	Choose clustering and searching techniques for different data base systems

SYLLABUS: IMAGE PROCESSING &PATTERN RECOGNITION
(M17 IT 1211)
(ELECTIVE-II)

UNIT I:

Pattern Recognition: machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation. Bayesian Decision Theory: Introduction, continuous features-two categories classifications, minimum error rate classification-zero-one loss function, classifiers, discriminate functions, and decision surfaces

UNIT II:

Normal density: Univariate and multivariate density, discriminate functions for the normal density-different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context. Component analyses: Principal component analysis, non-linear component analysis, Low dimensional representations, and multi dimensional scaling.

UNIT III:

Digitized Image and its properties: Basic concepts, Image Functions, the dirac distribution and convolution, the Fourier transform, Images as a Stochastic process, Images as linear systems. Image Digitization: Sampling, Quantization, Colour Images. Digital Image Properties: Metric and topological properties of Digital Images, Histograms, Visual perception of the Image, Image quality, Noise in Images..

UNIT IV:

Data Structures for Image Analysis: Levels of Image Data representation, traditional Image Data Structures-Matrices, Chains, Topological Data Structures, Relational Structures.

UNIT V:

Image Pre-processing: Pixel brightness transformation – Position dependent brightness correction, Gray scale transformation. Geometric Transformations --Pixel co-ordinate transformation, Brightness interpolation. Local Pre-processing – Image smoothing, Edgedetectors, Zero crossings of the second deritives, scale in Image processing, canny edge detection, parametric edge models, edges in multi spectral images, other local pre-processing operators, adaptive neighborhood pre-processing

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1211	
Course Title: IMAGE PROCESSING & PATTERN RECOGNITION (ELECTIVE-II)	
CO-1	Identify areas where Pattern Recognition and Machine Learning can offer a solution
CO-2	Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems
CO-3	Describe genetic algorithms, validation methods and sampling techniques
CO-4	Describe some discriminative, generative and kernel based techniques

SYLLABUS: SOFTWARE TESTING METHODOLOGIES (M17 IT 1212)
(ELECTIVE-II)

UNIT-I:

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs. Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT-II:

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques. Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT-III:

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability. Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

UNIT-IV:

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, and Specifications. State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.

UNIT–V:

Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 IT 1212	
Course Title: SOFTWARE TESTING METHODOLOGIES (ELECTIVE-II)	
CO-1	Understand the myths and facts of software testing. Analyze and design test cases using black box testing technique which includes decision tables domain testing and transition testing.
CO-2	Analyze and design test cases for a white box testing technique which includes path¬ testing, data flow graphs and matrix representation for a given problem.
CO-3	Compute the path product and construct Regular Expression which is used to i identify¬ the alternate paths from source node to destination node for any application.
CO-4	Execute how to run test script wizard and Execute how to do performance testing using¬ testing tools including Win runner and Meter respectively.
CO-5	Demonstrate the importance of testing and its role in need of software development.

SYLLABUS: IT LAB2 (M17 IT 1213)

1. Write a Program to count the number of words and lines supplied at standard input using UNIX shell programming?
2. Write a shell script to find the factorial of a number entered through keyboard?
3. Write a shell script to find the gross salary given that if the basic salary is less then 1500 then HRA =10% of basic salary and DA=90% if the basic salary is greater then or equal to 1500 then HRA=500 and DA=98% of basic salary. The employee"s basic salary is the input through keyboard?
4. Write a shell script to display following information using case statement?
a) List users
b) Show date
c) Display file
d) Change working directory
e) Return to original directory
f) Quit
5. Write a c program to implement one to one chat application using sockets?
6. Write a c program to implement redundancy check using CRC?
7. Write a java program to implement simulation of sliding window protocol?
8. Write a java program to get the MAC or Physical address of the system using Address Resolution Protocol?
9. Write a java program to implement Play Fair Cipher to encrypt and decrypt a given message?
10. Write a java program to demonstrate public-key based asymmetric algorithms for encryption-based security of information?
11. Write a java program that implement secured Internet Protocol (IP) communications by using Internet Protocol Security (IPSec)?
12. Write a java program to implement RSA algorithm?

Course Outcomes for First Year Second Semester Course	
Course Code:M17 IT 1213	
Course Title: IT LAB 2	
CO-1	Student able to execute programmes in UNIX
CO-2	Student able to excute programmes on JAVA
CO-3	Student able to excute programmes on Network programming

Regulation: R17		M.Tech. III - Semester				
INFORMATION TECHNOLOGY(INFORMATION TECHNOLOGY) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17 IT2101	Comprehensive Viva-Voce	Viva-Voce	2	50	-	50
M17 IT2102	Seminar-I	Oral Presentation	2	50	-	50
M17 IT2103	Project Work Part-I	Review	16	50	-	50
Total			**20**	**150**	**-**	**150**

1. The Viva-Voce for the Comprehensive Viva-Voce and Seminar-I shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. 2. Candidates can do their Project Work Part-I&II work within the department or in any industry/research organization for two semesters (i.e. 3rd and 4th semesters). In case of thesis done in an industry/research organization, one advisor (Guide) should be from the department and one advisor (Co-Guide) should be from the industry/research organization.

3. 3. The Project Work Part-I should be submitted at the end of 3rd Semester and it will be evaluated through Review by a committee consisting of Head of the Department, PG coordinator and Project guide. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

Regulation: R17			M.Tech. IV - Semester			
INFORMATION TECHNOLOGY(INFORMATION TECHNOLOGY) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17 IT2201	Seminar-II	Oral presentation	2	50	-	50
M17 IT2202	Project Work Part-II	Viva-voce	18		100	100
Total			**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20 and 20 Marks by the members respectively

EMPLOYBILITY COURSES

MECHANICAL ENGINEERING

Regulation: R17					M.Tech. I - Semester				
MECHANICAL ENGINEERING(CAD/CAM) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)									
Code No.	**Name of the Subject**	**C**	**C**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17 CAD1101	Industrial Robotics	ES	3	3	1	--	30	70	100
M17 CAD1102	Computer Aided Manufacturing	ES	3	3	1	--	30	70	100
M17 CAD1103	Special Manufacturing Processes	ES	3	3	1	--	30	70	100
M17 CAD1104	Geometric Modelling	ES	3	3	1	--	30	70	100
#ELE-1	Elective-I	ES	3	3	1	--	30	70	100
#ELE-2	Elective-II	ES	3	3	1	--	30	70	100
M17 CAD1111	Computer Aided Design Lab	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	Course Code	**Course**
#ELE-1	M17 CAD 1105	Computational Methods in Engineering
	M17 CAD 1106	Theory of Elasticity &Plasticity
	M17 CAD 1107	Nano Technology
#ELE-2	M17 CAD 1108	Design for Manufacturing &Assembly
	M17 CAD 1109	Mechatronics
	M17 CAD 1110	Computer Aided Process Planning

SYLLABUS: INDUSTRIAL ROBOTICS (M17 CAD1101)

INDUSTRIAL ROBOTICS

UNIT-I

INTRODUCTION: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation scheme, work volume, robot drive systems, control systems and dynamic performance, precision of movement. CONTROL SYSTEM AND COMPONENTS: basic concepts and motion controllers, control system analysis, robot actuation and feedback components, Positions sensors, velocity sensors, actuators, power transmission systems, robot joint control design.

UNIT-II

MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation, forward and inverse transformations, homogeneous transformations, manipulator path control, robot arm dynamics, configuration of a robot controller.

UNIT-III

END EFFECTORS: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design. SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics. MACHINE VISION: Functions, Sensing and Digitizing-imaging devices, Lighting techniques, Analog to digital single conversion, image storage: Image processing and Analysis-image data reduction, Segmentation, feature extraction, Object recognition. Training the vision system, Robotic application..

UNIT-IV

ROBOT PROGRAMMING: Lead through programming, Robot program as a path in space, Motion interpolation, WAIT, SIGNAL AND DELAY commands, Branching, capabilities and Limitations of lead through methods. ROBOT LANGUAGES: Textual robot Languages, Generations of robot programming languages, Robot language structures, Elements and function.

UNIT-V

ROBOT CELL DESGIN AND CONTROL: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detection, Work cell controller. ROBOT APPLICATION: Material transfer, Machine loading/unloading, Processing operation, Assembly and Inspection, Future Application.

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1101	
Course Title: Industrial Robotics	
CO-1	Distinguish between fixed automation and programmable automation.
CO-2	Identify various components of robot.
CO-3	Select appropriate type of actuator for a joint.
CO-4	Illustrate robot applications in manufacturing.
CO-5	Analyze kinematics of a robot.
CO-6	Derive equations of motion of a manipulator for a particular application.

SYLLABUS: COMPUTER AIDED MANUFACTURING (M17 CAD1102)

UNIT-I

COMPUTER AIDED PROGRAMMING: General information, APT programming, Examples Apt programming problems (2D machining only). NC programming on CAD/CAM systems, the design and implementation of post processors .Introduction to CAD/CAM software, Automatic Tool Path generation.

UNIT-II

TOOLING FOR CNC MACHINES: Interchangeable tooling system, preset and qualified toois, coolant fed tooling system, modular fixturing, quick change tooling system, automatic head changers. DNC Systems and Adaptive Control: Introduction, type of DNC systems, advantages arid disadvantages of DNC, adaptive control with optimization, Adaptive control with constrains, Adaptive control of machining processes like turning, grinding.

UNIT-III

POST PROCESSORS FOR CNC: Introduction to Post Processors: The necessity of a Post Processor, the general structure of a Post Processor, the functions of a Post Processor, DAPP —based- Post Processor: Communication channels and major variables in the DAPP —based Post Processor, creation of a DAPP — Based Post Processor.

UNIT-IV

MICRO CONTROLLERS: Introduction, Hardware components, I/O pins, ports, external memory:, counters, timers and serial data I/O interrupts. Selection of Micro Controllers Embedded Controllers, Applications and Programming of Micro Controllers. Programmable Logic Controllers (PLC' s): Introduction, Hardware components of PLC, System, basic structure, principle of operations, Programming mnemonics timers, Internal relays and counters, Applications of PLC's in CNC Machines.

UNIT-V

COMPUTER AIDED PROCESS PLANNING: Hybrid CAAP System, Computer Aided Inspection and quality control, Coordinate Measuring Machine, Limitations of CMM, Computer Aided Testing, Optical Inspection Methods, Artificial Intelligence and expert system: Artificial Neural Networks, Artificial Intelligence in CAD, Experts systems and its structures.

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1102	
Course Title: Computer Aided Manufacturing	
CO-1	Understand the principles of Numerical Control (NC) technology and describe the range of machine tools to which it is applied.
CO-2	Outline the various routs for part programming in NC and CNC.
CO-3	Explain the application of CNC for Machining & Turning Centers.
CO-4	Apply the use of various transducers, Micro controllers encoders and feedback devices in CAM.
CO-5	Apply the principles of Computer Aided Process Planning in CAM.

SYLLABUS: SPECIAL MANUFACTURING PROCESSESS (M17 CAD 1103)

UNIT-I

SURFACE TREATMENT: Scope, Cleaners, Methods of cleaning, Surface coating types, and ceramic and organic methods of coating, economics of coating. Electro forming, Chemical vapor deposition, thermal spraying, Ion implantation, diffusion coating, Diamond coating and cladding

UNIT-II

PROCESSING OF CERAMICS: Applications, characteristics, classification .Processing of particulate ceramics, Powder preparations, consolidation, Drying, sintering, Hot compaction, Area of application, finishing of ceramics. Processing of Composites: Composite Layers, Particulate and fiber reinforced composites, Elastomers, Reinforced plastics, MMC, CMC, Polymer matrix composites.

UNIT-III

FABRICATION OF MICRO ELECTRONIC DEVICES: Crystal growth and wafer preparation, Film Deposition oxidation, lithography, bonding and packaging, reliability and yield, Printed Circuit boards, computer aided design in micro electronics, surface mount technology, Integrated circuit economics.

UNIT-IV

ADVANCED MACHINING PROCESSES: EDM, Wire EDM, ECM, LBM, EBM, AJM, WJM – Principle, working, limitations and applications.

UNIT-V

RAPID PROTOTYPING: Working Principles, Methods, Stereo Lithography, Laser Sintering, Fused Deposition Method, Applications and Limitations, Rapid tooling, Techniques of rapid manufacturing

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1103	
Course Title: Special Manufacturing Processes	
CO-1	Describe the principle and operation of common manufacturing and rapid prototyping processes for product development.
CO-2	Decide on the use of appropriate manufacturing processes in the manufacture of a product at the design stage.
CO-3	Apply up-to-date technology in manufacturing products with considerations of safety and environmental factors.
CO-4	Apply the reverse engineering process for product development.
CO-5	Appreciate and report on the common practice in the product development industry.
CO-6	Develop a prototype with modern prototyping techniques.

SYLLABUS: GEOMETRIC MODELLING (M17 CAD1104)

UNIT-I

Cubic splines –I Definition, Explicit and implicit equations, parametric equations, Algebraic and geometric form of cubic spline, Hermite cubic spline, tangent vectors, parametric space of a curve, blending functions.

UNIT-II

Cubic Splines-II: Four point form, reparametrization, truncating and subdividing of curves. Graphic construction and interpretation, composite pc curves. Bezier Curves: Bernstein basis, equations of Bezier curves, properties, derivatives..

UNIT-III

B-Spline Curves: B-Spline basis, equations, knot vectors, properties, and derivatives.

UNIT– IV

Surfaces: Bicubic surfaces, Coon's surfaces, Bezier surfaces, B-Spline surfaces, surfaces of revolutions, Sweep surfaces, ruled surfaces, tabulated cylinder, bilinear surfaces, Gaussian curvature..

UNIT– V

Solids: Tricubic solid, Algebraic and geometric form. Solid modeling concepts: Wire frames, Boundary representation, Half space modeling, spatial cell, cell decomposition, classification problem.

Course Outcomes for Final Year First Semester Course	
Course Code:M17 CAD 1104	
Course Title: Geometric Modeling	
CO-1	Use various mathematical equations to represent curves.
CO-2	Apply the cubic spines in modelling of a product.
CO-3	Select appropriate synthetic curves in modelling process.
CO-4	Implement the surface modelling for design of various consumer products.

COMPUTATIONAL METHODS IN ENGINEERING

(M17 CAD 1105)

(ELECTIVE-I)

UNIT– I

Introduction to numerical methods applied to engineering problems: : Examples, solving sets of equations – Matrix notation – Determinants and inversion – Iterative methods – Relaxation methods – System of non-linear equations. Least square approximation fitting of non-linear curves by least squares –regression analysis- multiple linear regression, non linear regression -computer programs.

UNIT– II

Boundry value problems and charecteristic value problems: Shooting method – Solution through a set of equations – Derivative boundary conditions – Rayleigh – Ritz method – Characteristic value problems..

UNIT– III

Transformation Techniques: Continuous fourier series, frequency and time domains, laplace transform, fourier integral and transform, discrete fourier transform (DFT), Fast fourier transform (FFT).

UNIT– IV

Numerical solutions of partial differential equations: Laplace's equations – Representations as a difference equation – Iterative methods for Laplace's equations – poisson equation –Examples – Derivative boundary conditions – Irregular and non – rectangular grids – Matrix patterns, sparseness – ADI method – Finite element method.

UNIT– V

Partial differential equations: Explicit method – Crank-Nickelson method – Derivative boundary condition – Stability and convergence criteria. Solving wave equation by finite differences-stability of numerical method –method of characteristics-wave equation in two space dimensions-computer programs.

Course Outcomes for Final Year First Semester Course	
Course Code:M17 CAD 1105	
Course Title: Computational Methods in Engineering(Elective-I)	
CO-1	Find the solutions of system of linear and non linear equations.
CO-2	Solve ordinary and partial differential equations numerically.
CO-3	Find correlation coefficient and regression.
CO-4	Use a computer language of their choice to solve problems using numerical methods covered in the course.

SYLLABUS: THEORY OF ELASTICITY &PLASTICITY (M17 CAD1106)

(ELECTIVE-I)

UNIT-I

Elasticity: Two dimensional stress analysis - Plane stress - Plane strain - Equations of compatibility - Stress function - Boundary conditions. Problem in Rectangular Coordinates - Solution by polynomials - Saint Venent's principles - Determination of displacement - Simple beam problems. Problems in Polar Coordinates - General equations in polar coordinates - Stress distribution symmetrical about axis - Strain components in polar coordinates - Simple and symmetric problems.

UNIT-II

Analysis of Stress and Strain in Three Dimensions: Principle stresses - Homogeneous deformations - Strain spherical and deviatoric stress - Hydrostatic strain. General Theorems: Differential equations of equilibrium and compatibility - Displacement - Uniqueness of solution - Reciprocal theorem.

UNIT-III

Bending of Prismatic Bars: Stress function - Bending of cantilever beam - Beam of rectangular cross-section - Beams of circular cross-section.

UNIT-IV

Plasticity: Plastic deformation of metals - Structure of metals - Deformation - Creep stress relaxation of deformation - Strain rate condition of constant maximum shear stress - Condition of constant strain energy - Approximate equation of plasticity.

UNIT-V

Methods of Solving Practical Problems: The characteristic method - Engineering method - Compression of metal under press - Theoretical and experimental data drawing

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1106	
Course Title: Theory of Elasticity & Plasticity(Elective-I)	
CO-1	Understand the stress and strain tensor field.
CO-2	Understand the contact stresses analysis problem in bearing.
CO-3	Understand advanced concepts of plasticity and plastic deformation analysis
CO-4	Students can demonstrate Idealized stress-strain diagrams for different material models and demonstrate experimental verification of the Prandtl-Reuss equation.

SYLLABUS: NANO TECHNOLOGY (M17 CAD1107)

(ELECTIVE-I)

UNIT-I

Introduction, Size and shape dependence of material properties at the nano scale, scaling relations, can nano robots walk and nano planes fly, Nano scale elements in conventional technologies, Mechanics at nano scale Enhancement of mechanical properties with decreasing size, Nano electromechanical systems, nano machines, Nano fluidics, filtration, sorting, Molecular motors, Application of Nano Technology.

UNIT-II

Nano material Synthesis Techniques: Top-down and bottom-up nanofabrication, Synthesis of nano composites, The Intel-IBM approach to nanotechnology: lithography, etching, ion implantation, thin film deposition, nano coatings and nano indentation, Electron beam lithography, Soft lithography: nano imprinting and micro-contact printing, Solution/plasma phase nanofabrication, sol-gel methods, template techniques.

UNIT-III

Imaging/characterization of nanostructures General considerations for imaging, Scanning probe techniques: XRD, SEM, TEM, AFM and NSOM.

UNIT-IV

Metal and semiconductor nano particles Synthesis, stability, control of size, Optical and electronic properties, Ultra-sensitive imaging and detection with nano particles, bioengineering applications, Catalysis. Semiconductor and metal nano wires Vapor/liquid/solid growth and other synthesis techniques, Nano wire transistors and sensors..

UNIT-V

Carbon nano tubes, Structure and synthesis, Electronic, vibrational, and mechanical properties, How can C nano tubes enable faster computers, brighter TV screens, and stronger mechanical reinforcement?

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1107	
Course Title: Nano Technology(Elective-I)	
CO-1	Understand the fundamental principles of nanotechnology and their application.
CO-2	Apply engineering and physics concepts to the nano-scale and non-continuum domain.
CO-3	Demonstrate a comprehensive understanding of nano-fabrication methods.
CO-4	Evaluate processing conditions to engineer functional nano materials.
CO-5	Practice and explain state-of-the-art characterization methods for nano materials, understanding and critiquing nano material safety and handling methods required during characterization

SYLLABUS: DESIGN FOR MANUFACTURING &ASSEMBLY (M17 CAD1108)

(ELECTIVE-II)

UNIT-I

Introduction to DFM, DFMA: How Does DFMA Work? Reasons for Not Implementing DFMA,What Are the Advantages of Applying DFMA During Product Design?, Typical DFMA Case Studies, Overall Impact of DFMA on Industry. Design for Manual Assembly: General Design Guidelines for Manual Assembly, Development of the Systematic DFA Methodology, Assembly Efficiency, Effect of Part Symmetry, Thickness, Weight on Handling Time, Effects of Combinations of Factors, Application of the DFA Methodology.

UNIT-II

Machining processes: Overview of various machining processes-general design rules for machining-dimensional tolerance and surface roughness-Design for machining – ease – redesigning of components for machining ease with suitable examples. General design recommendations for machined parts.

UNIT-III

Metal casting: Appraisal of various casting processes, selection of casting process,-general design considerations for casting-casting tolerance-use of solidification, simulation in casting design-product design rules for sand casting. Extrusion & Sheet metal work: Design guide lines extruded sections-design principles for punching, blanking, bending, deep drawing-Keeler Goodman forging line diagram – component design for blanking

UNIT-IV

Metal joining: Appraisal of various welding processes, factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints design of brazed joints. Forging: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations

UNIT– V

Design for Assembly Automation: Fundamentals of automated assembly systems, System configurations, parts delivery system at workstations, various escapement and placement devices used in automated assembly systems, Quantitative analysis of Assembly systems, Multi station assembly systems, single station assembly lines.

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1108	
Course Title: Design for Manufacturing &Assembly (Elective-II)	
CO-1	Select the design principle, suitable material, mechanism, fit and tolerance for designing a product/component.
CO-2	Select the appropriate material, proper working principle and a feasible design.
CO-3	Design (optimum) a component which requires less material removal, easy to machine, assemble, access and cost effective.
CO-4	Redesign the uneconomical casting design and know the applications of DFMA.
CO-5	Incorporate the Environmental Objectives, issues and guidelines into the design.

SYLLABUS: MECHATRONICS

(M17 CAD 1109)

ELECTIVE-II

UNIT-I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems. Sensors and transducers, types, displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT-II

Solid state electronic devices, PN junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT-III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems, Mechanical actuating systems and electrical actuating systems..

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control..

UNIT-V

System and interfacing and data acquisition, DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response. Design of mechatronics systems & future trends..

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1109	
Course Title: Mechatronics(Elective-II)	
CO-1	Model and analyze electrical and mechanical systems and their interconnection.
CO-2	Integrate mechanical, electronics, control and computer engineering in the design of mechatronics systems.
CO-3	Do the complete design building, interfacing and actuation of a mechatronic system for a set of specifications

SYLLABUS: COMPUTER AIDED PROCESS PLANNING (M17 CAD1110)

(ELECTIVE-II)

UNIT-I

Introduction to CAPP: Information requirement for process planning system, Role of process planning, advantages of conventional process planning over CAPP, Structure of Automated process planning system, feature recognition, methods

UNIT-II

Generative CAPP system: Importance, principle of Generative CAPP system, automation of logical decisions, Knowledge based systems, Inference Engine, implementation, benefits. Retrieval CAPP system: Significance, group technology, structure, relative advantages, implementation, and applications.

UNIT– III

Selection of manufacturing sequence Significance, alternative manufacturing processes, reduction of total set-up cost for a particular sequence, quantitative methods for optimal selection, examples. Determination of machining parameters: reasons for optimal selection of machining parameters, effect of parameters on production rate, cost and surface quality, different approaches, advantages of mathematical approach over conventional approach, solving optimization models of machining processes.

UNIT–IV

Determination of manufacturing tolerances: design tolerances, manufacturing tolerances, methods of tolerance allocation, sequential approach, integration of design and manufacturing tolerances, advantages of integrated approach over sequential approach.

UNIT–V

Generation of tool path: Simulation of machining processes, NC tool path generation, graphical implementation, determination of optimal index positions for executing fixed sequence, quantitative methods. Implementation techniques for CAPP: MIPLAN system, Computer programming languages for CAPP, criteria for selecting a CAPP system and benefits of CAPP. Computer integrated planning systems, and Capacity planning system.

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1110	
Course Title: Computer Aided Process Planning(Elective-II)	
CO-1	Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation.
CO-2	Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence.
CO-3	Predict the effect of machining parameters on production rate, cost and surface quality and determines the manufacturing tolerances.
CO-4	Explain the generation of tool path and solve optimization models of machining processes.
CO-5	Create awareness about the implementation techniques for CAPP

SYLLABUS: COMPUTER AIDED DESIGN LAB (M17 CAD1111)

2D and 3D modelling and assembly modelling using modelling packages like AutoCAD, Auto Desk Mechanical desktop, Pro-Engineer, IDEAS. Linear and non-linear static and dynamic analysis using any FEA package ANSYS / CAEFEM / NASTRAN.

Course Outcomes for Final Year First Semester Course	
Course Code: M17 CAD 1111	
Course Title: Computer Aided Design Lab	
CO-1	Find the solutions of system of linear and non linear equations.
CO-2	Solve ordinary and partial differential equations numerically.
CO-3	Find correlation coefficient and regression.
CO-4	Use a computer language of their choice to solve problems using numerical methods covered in the course.

Regulation: R17					M.Tech. II - Semester				
MECHANICAL ENGINEERING(CAD/CAM) (under Choice Based Credit System / Elective Course System)									
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batchonwards)									
Code No.	**Name of the Subject**	**C**	**Cr**	**L**	**Tutorial Hrs**	**Lab Hrs**	**Internal Marks**	**External Marks**	**Total Marks**
M17 CAD1201	Modeling &Simulation of Manufacturing Systems	ES	3	3	1	--	30	70	100
M17 CAD1202	Optimization &Reliability	ES	3	3	1	--	30	70	100
M17 CAD1203	Computer Graphics	ES	3	3	1	--	30	70	100
M17 CAD1204	Finite Element Methods	ES	3	3	1	--	30	70	100
#ELE-3	Elective-III	ES	3	3	1	--	30	70	100
#ELE-4	Elective-IV	ES	3	3	1	--	30	70	100
M17 CAD1211	Computer Aided Manufacturing Lab	ES	2	--	--	3	50	50	100
Total			**20**	**18**	**6**	**3**	**230**	**470**	**700**

	Course Code	**Course**
#ELE-3	M17 CAD 1205	Quality Engineering in Manufacturing
	M17 CAD 1206	Mechanical Vibrations
	M17 CAD 1207	Concurrent Engineering
#ELE-4	M17 CAD 1208	Mechanics &Manufacturing Methods of Composites
	M17 CAD 1209	Materials Technology
	M17 CAD 1210	Intelligent Manufacturing Systems

MODELLINGAND SIMULATION OF MANUFACTURING SYSTEMS (M17 CAD 1201)

UNIT-I

Introduction to System and simulation: Concept of system and elements of system, Discrete and continuous system, Models of system and Principles of modeling and simulation, Monte carlo simulation, Types of simulation, Steps in simulation model, Advantages, limitations and applications of simulation, Applications of simulation in manufacturing system..

UNIT-II

Review of statistics and probability: Types of discrete and continuous probability distributions such as Geometric, Poisson, Uniform, Geometric distribution with examples, Normal, Exponential distribution with examples.

UNIT-III

Random numbers: Need for RNs, Technique for Random number generation such as Mid product method, Mid square method, and Linear congruential method with examples Test for Random numbers: Uniformity - Chi square test or Kolmogorov Smirnov test, Independency Auto correlation test Random Variate generation: Technique for Random variate generation such as Inverse transforms technique or Rejection method.

UNIT-IV

Analysis of simulation data: Input data analysis, Verification and validation of simulation models, Output data analysis Simulation languages: History of simulation languages, Comparison and selection of simulation languages Design and evaluation of simulation experiments: Development and analysis of simulation models using simulation language with different manufacturing systems..

UNIT-V

Queueing models: An introduction, M/M/1 and M/M/m Models with examples, Open Queueing and Closed queueing network with examples Markov chain models and others: Discrete time markov chain with examples, Continues time markov chain with examples, stochastic process in manufacturing, Game theory.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1201	
Course Title: Modelling& Simulation of Manufacturing Systems	
CO-1	Students gain knowledge on various types of simulation and simulation languages steps in simulation and applications of simulation.
CO-2	Students gain knowledge on parameter estimation and hypothesis.
CO-3	Students can build simulation model and also can validation and verify model.
CO-4	Students can gain knowledge on Generation of random variants and variables.

SYLLABUS: OPTIMIZATION & RELIABILITY (M17 CAD1202)

UNIT-I

CLASSICAL OPTIMIZATION TECHNIQUES: Single variable optimization with and without constraints, multi – variable optimization without constraints, multi – variable optimization with constraints – method of Lagrange multipliers, Kuhn-Tucker conditions, merits and demerits of classical optimization techniques.

UNIT-II

NUMERICAL METHODS FOR OPTIMIZATION: Nelder Mead‘s Simplex search method, Gradient of a function, Steepest descent method, Newton‘s method, Pattern search methods, conjugate method, types of penalty methods for handling constraints, advantages of numerical methods.

UNIT-III

GENETIC ALGORITHM (GA): Differences and similarities between conventional and evolutionary algorithms, working principle, reproduction, crossover, mutation, termination criteria, different reproduction and crossover operators, GA for constrained optimization, draw backs of GA, **GENETIC PROGRAMMING (GP):** Principles of genetic programming, terminal sets, functional sets, differences between GA & GP, random population generation, solving differential equations using GP. **MULTI-OBJECTIVE GA**: Pareto‘s analysis, Non-dominated front, multi – objective GA, Non-dominated sorted GA, convergence criterion, applications of multi-objective problems

UNIT– IV

APPLICATIONS OF OPTIMIZATION IN DESIGN AND MANUFACTURING SYSTEMS: Some typical applications like optimization of path synthesis of a four-bar mechanism, minimization of weight of a cantilever beam, optimization of springs and gears, general optimization model of a machining process, optimization of arc welding parameters, and general procedure in optimizing machining operations sequence.

UNITV

RELIABILITY: Concepts of Engineering Statistics, risk and reliability, probabilistic approach to design, reliability theory, design for reliability, numerical problems, hazard analysis.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1202	
Course Title: Optimization & Reliability	
CO-1	Have a basic understanding of conventional, unconventional optimization algorithms and concepts of reliability.
CO-2	Formulate engineering design problems as mathematical optimization problems and solve them by using suitable optimization technique(s).
CO-3	Use mathematical software for the solution of engineering problems.
CO-4	Several homework assignments delving on core concepts and reinforcing analytical skills learned in class.

SYLLABUS: COMPUTER GRAPHICS (M17 CAD1203)

UNIT-I

Raster scan graphics: Raster scan and random scan architecture, Line drawing algorithms –DDA & Bresenham algorithms, circle generation, general function rasterization, displaying lines, characters and polygons.

Filling algorithms: polygon filling, edge fill algorithm, seed fill algorithm, fundamentals of anti aliasing and half toning.

UNIT-II

Line CLIPPING: Simple visibility algorithm, Cohen-Sutherland subdivision line clipping algorithm, midpoint sub division algorithm.

Polygon clipping: polygon clipping, reentrant polygon clipping – Sutherland – Hodgeman algorithm, character clipping, 3D-clipping.

UNIT-III

Rendering: Hidden line removal algorithms, surface removal algorithms, painters, Warnock, Zbuffer algorithm.

Shading algorithms: Constant intensity algorithm, Phong's shading algorithm, gour and shading algorithm, Comparison of shading algorithms.

UNIT-IV

Computer Animation: Design of animation sequence, general computer animation functions, raster animation, computer animation language, key frame system, motion specification

UNIT– V

Introduction to Multimedia: Introduction, multimedia- systems, technology, architecture, trade-offs, contents, PC, Applications, data compressions, authoring system.

Multimedia Authoring Tools: Introduction, Types of authoring tools, Package based- in card authoring tools, Icon based authoring tools, Time based and presentation tools, object oriented authoring tools, author ware professional for windows (APW).

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CAD 1203	
Course Title: Computer Graphics	
CO-1	Understand the contemporary graphics hardware and terminology.
CO-2	Implement graphics primitives, line clipping, polygon clipping, rendering and shading algorithms.
CO-3	Design and implement an application which illustrates the use of output primitives and 3D viewing model.
CO-4	Gain knowledge on computer animation and multimedia tools used for the computer representation of objects.

SYLLABUS: FINITE ELEMENT METHODS (M17 CAD1204)

UNIT-I

Formulation Techniques: Methodology, Engineering problems and governing differential equations , finite elements, Variational methods-potential energy method, Raleigh Ritz method, strong and weak forms, Galerkin and weighted residual methods, calculus of variations, Essential and natural boundary conditions.

UNIT– II

One-dimensional elements: Bar trusses, beams and frames, displacements, stresses and temperature effects.

UNIT– III

Two dimensional problems: CST, LST, four noded and eight nodded rectangular elements, Lagrange basis for triangles and rectangles, serendipity interpolation functions. Axisymmetric Problems: Axisymmetric formulations, Element matrices, boundary conditions.

UNIT– IV

Isoparametric formulation: Concepts, sub parametric, super parametric elements, numerical integration, Requirements for convergence, h-refinement and p-refinement, complete and incomplete interpolation functions, Pascal's triangle, Patch test. Heat Transfer problems: Conduction and convection, examples: - two-dimensional fin.

UNIT– V

Finite elements in Structural Analysis: Static and dynamic analysis, eigen value problems, and their solution methods, case studies using commercial finite element packages.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1204	
Course Title: Finite Element Methods	
CO-1	Apply variational and weighted residual methods to solve differential equations.
CO-2	Analyze 1-D bar, truss, beam and heat conduction problems using finite element method.
CO-3	Develop finite element formulations and solve 2-D structural problems using triangular and rectangular elements.
CO-4	Analyze vibration problems for frequencies and mode shapes.

QUALITY ENGINEERING MANUFACTURING (M17 CAD1205)

(ELECTIVE-III)

UNIT-I

QUALITY VALUE AND ENGINEERING: An overall quality system, quality engineering in production design, quality engineering in design of production processes. Loss Function and Quality Level: Derivation and use of quadratile loss function, economic consequences of tightening tolerances as a means to improve quality, evaluations and types tolerances. (N-Type, type and L-type)

UNITII:

TOLERANCE DESIGN AND TOLERANCING: Functional limits, tolerance design for Ntype. L-type and S-type characteristics, tolerance allocation fbr multiple components. Parameter and Tolerance Design: Introduction to parameter design, signal to noise ratios, Parameter design strategy, some of the case studies on parameter and tolerance designs.

UNIT– III

ANALYSIS OF VARIANCE (ANOVA): Introduction to ANOVA, Need for ANOVA, NOway ANOVA, One-way ANOVA, Two-way ANOVA, Critique of F-test, ANOVA for four level factors, multiple level factors.

UNIT-IV

ORTHOGONAL ARRAYS: Typical test strategies, better test strategies, efficient test strategies, steps in designing, conducting and analyzing an experiment. Interpolation of Experimental Results: Interpretation methods, percent contributor, estimating the mean.

UNIT-V

SIX SIGMA AND THE TECHNICAL SYSTEM: Six sigma DMAIC methodology, tools for process improvement, six sigma in services and small organizations, statistical foundations, statistical methodology.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1205	
Course Title: Quality Engineering in Manufacturing(Elective-III)	
CO-1	Explain quality standards and need for standardization
CO-2	Implement quality measurement systems in various applications
CO-3	Implement six sigma approach for various industrial applications
CO-4	Gain knowledge on Analysis of Variance, Orthogonal Arrays and statistical methodology.

SYLLABUS: MECHANICAL VIBRATIONS (M17 CAD1206)

(ELECTIVE-III)

UNIT-I

Single degree of Freedom systems: Undamped and damped free vibrations: forced vibrations ; coulomb damping; Response to harmonic excitation; rotating unbalance and support excitation, Vibration isolation and transmissibility, Vibrometers, velocity meters & accelerometers.

UNIT-II

Response to Non Periodic Excitations: unit Impulse, unit step and unit Ramp functions; response to arbitrary excitations, The Convolution Integral; shock spectrum; System response by the Laplace Transformation method.

UNIT-III

Multi degree freedom systems: Principal modes – undamped and damped free and forced vibrations; undamped vibration absorbers, Matrix formulation, stiffness and flexibility influence coefficients; Eigen value problem; normal modes and their properties; Free and forced vibration by Modal analysis; Method of matrix inversion; Torsional vibrations of multi – rotor systems and geared systems; Discrete-Time systems.

UNIT IV

Numerical Methods: Rayliegh's, Stodola's, Matrix iteration, Rayleigh-Ritz Method and Holzer's methods

UNIT V

Application of concepts: Free vibration of strings – longitudinal oscillations of bars transverse vibrations of beams- Torsional vibrations of shafts. Critical speeds without and with damping, secondary critical speed.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1206	
Course Title: Mechanical Vibrations(Elective-III)	
CO-1	Develop a mathematical model for a physical system and derive the governing differential equations.
CO-2	Determine the natural frequencies of single and two degrees of freedom systems without and with damping.
CO-3	Determine and analyze the response of machine members or structures in forced vibration with different excitation frequencies.
CO-4	Apply the techniques of vibration isolation to minimize the transmission of vibrating forces.
CO-5	Determine the natural frequencies and mode shapes of bars in elongation and torsion and beams in bending.

SYLLABUS: CONCURRENT ENGINEERING (M17 CAD1207)

(ELECTIVE-III)

UNIT I:

INTRODUCTION

Extensive definition of CE - CE design methodologies - Organizing for CE - CE tool box collaborative product development

USE OF INFORMATION TECHNOLOGY

IT support - Solid modeling - Product data management - Collaborative product commerce - Artificial Intelligence - Expert systems - Software hardware co-design

UNIT II:

DESIGN STAGE

Life-cycle design of products - opportunity for manufacturing enterprises - modality of Concurrent Engineering Design –Automated analysis idealization control - Concurrent engineering in optimal structural design -Real time constraints.

UNIT III:

MANUFACTURING CONCEPTS AND ANALYSIS

Manufacturing competitiveness - Checking the design process - conceptual design mechanism –Qualitative, physical approach - An intelligent design for manufacturing system

UNIT IV:

JIT system - low inventory - modular - Modeling and reasoning for computer based assembly planning-Design of Automated manufacturing.

PROJECT MANAGEMENT

Life Cycle semi realization - design for economics - evaluation of design for manufacturing cost

UNIT V

Concurrent mechanical design - decomposition in concurrent design - negotiation in concurrent engineering design studies - product realization taxonomy - plan for Project Management on new product development – bottleneck technology development.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1207	
Course Title: Concurrent Engineering(Elective-III)	
CO-1	Understand the concepts of concurrent engineering and its application in design and manufacturing of a product
CO-2	Know how to solve issues arising during design and manufacturing of a product
CO-3	Understand the importance of tolerances in product design and manufacturing
CO-4	Understand how to automate a work station& fabrication system.
CO-5	Understand the importance of human resource management

SYLLABUS: MECHANICS &MANUFACTURING METHODS OF COMPOSITES (M17 CAD1208)
(ELECTIVE-IV)

UNIT– I

Basic concepts and characteristics: Geometric and Physical definitions, natural and manmade composites, Aerospace and structural applications, types and classification of composites, Fibres- Glass, Silica, Kevlar, carbon, boron, silicon carbide, and born carbide fibres. Particulate composites, Polymer composites, Thermoplastics, Thermosetts, Metal matrix and ceramic composites.

UNIT– II

Micromechanics: Unidirectional composites, constituent materials and properties, elastic properties of a lamina, properties of typical composite materials, laminate characteristics and configurations. Characterization of composite properties.

Coordinate transformations: Hooke's law for different types of materials, Hooke's law for two dimensional unidirectional lamina, Transformation of stress and strain, Numerical examples of stress strain transformation, Graphic interpretation of stress– strain relations. Off-axis, stiffness modulus, off-axis compliance.

UNIT– III

Elastic behavior of unidirectional composites: Elastic constants of lamina, relationship between engineering constants and reduced stiffness and compliances, analysis of laminated composites, constitutive relations.

Strength of unidirectional lamina: Micromechanics of failure, Failure mechanisms, Strength of an orthotropic lamina, Strength of a lamina under tension and shear maximum stress and strain criteria, application to design. The failure envelope, first ply failure, free-edge effects. Micro mechanical predictions of elastic constants.

UNIT– IV

Analysis of laminated composite plates

Introduction, thin plate theory, especially orthotropic plate, cross and angle ply laminated plates, problems using thin plate theory.

UNIT– V

Manufacturing methods: Autoclave, tape production, moulding methods, filament winding, handla yup, pultrusion, RTM.

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1208	
Course Title: Mechanics & Manufacturing Methods of Composites(Elective-IV)	
CO-1	Gain knowledge on fiber characteristics and methods of production of fibers1
CO-2	Identify the suitable composite manufacturing process when designing intricate and critical parts made of composites
CO-3	Analyse the elastic behaviour of composites and composite laminated plates.
CO-4	Gain knowledge on the failure of composites and the production of quality composites.

SYLLABUS: MATERIALS TECHNOLOGY (M17 CAD1209)

(ELECTIVE-IV)

UNITI:

Elasticity in metals, mechanism of plastic deformation, slip and twinning, role of dislocations, yield stress, shear strength of perfect and real crystals, strengthening mechanism, work hardening, solid solution, grain boundary strengthening. Poly phase mixture, precipitation, particle, fiber and dispersion strengthening, effect of temperature, strain and strain rate on plastic behavior, super plasticity, Yield criteria: Von-mises and Tresca criteria.

UNIT II:

Griffth's Theory, stress intensity factor and fracture Toughness, Toughening Mechanisms, Ductile and Brittle transition in steel, High Temperature Fracture, Creep, Larson – Miller parameter, Deformation and Fracture mechanism maps.

UNIT III:

Fatigue, fatigue limit, features of fatigue fracture, Low and High cycle fatigue test, Crack Initiation and Propagation mechanism and paris Law, Effect of surface and metallurgical parameters on Fatigue, Fracture of non-metallic materials, fatigue analysis, Sources of failure, procedure of failure analysis. Motivation for selection, cost basis and service requirements, Selection for Mechanical Properties, Strength, Toughness, Fatigue and Creep.

UNIT IV:

MODERN METALLIC MATERIALS: Dual Steels, Micro alloyed, High Strength Low alloy (HSLA) Steel, Transformation induced plasticity (TRIP) Steel, Maraging Steel, Inter metallics, Ni and Ti Aluminides. Processing and applications of Smart Materials, Shape Memory alloys, Metallic Glass Quasi Crystal and Nano Crystalline Materials.

UNIT V:

NON METALLIC MATERIALS: Polymeric materials and their molecular structures, Production Techniques for Fibers, Foams, Adhesives and Coatings, structure, Properties and Applications of Engineering Polymers, Advanced Structural Ceramics WC, TiC, TaC, A12O3, SiC, Si3N4, CBN and Diamond – properties, Processing and applications..

Course Outcomes for First Year Second Semester Course	
Course Code: M17 CAD 1209	
Course Title: Materials Technology(Elective-IV)	
CO-1	Gain knowledge on mechanism of plastic deformation and strengthening mechanism.
CO-2	Learn the structure, properties and applications of modern metallic materials, smart materials non-metallic materials and advanced structural ceramics.
CO-3	Understand the importance of advanced composite materials in application to sophisticated machine and structure of components.

SYLLABUS: INTELLIGENT MANUFACTURING SYSTEMS (M17 CAD1210)
(ELECTIVE-IV)

UNIT I:

COMPUTER INTEGRATED MANUFACTURING SYSTEMS: structure and functional areas of cim system- CAD, CAPP, CAM, CAQC, ASRS. Advantages of CIM. Manufacturing Communication Systems - MAP/TOP, OSI Model, Data Redundancy, Top down and Bottom-up Approach, Volume of Information. Intelligent Manufacturing System Components, System Architecture and Data Flow, System Operation.

UNIT II:

COMPONENTS OF KNOWLEDGE BASED SYSTEMS - Basic Components of Knowledge Based Systems, Knowledge Representation, Comparison of Knowledge Representation Schemes, Interference Engine, Knowledge Acquisition.

UNIT III:

MACHINE LEARNING - Concept of Artificial Intelligence, Conceptual Learning, Artificial, Neural Networks - Biological Neuron, Artificial Neuron, Types of Neural Networks, Applications in Manufacturing.

UNIT IV:

AUTOMATED PROCESS PLANNING - Variant Approach, Generative Approach, Expert Systems for Process Planning, Feature Recognition, Phases of Process planning. Knowledge Based System for Equipment Selection (KBSES) - Manufacturing system design. Equipment Selection Problem, Modeling the Manufacturing Equipment Selection Problem, Problem Solving approach in KBSES, Structure of the KRSES.

UNIT V:

GROUP TECHNOLOGY: Models and Algorithms Visual Method, Coding Method, Cluster Analysis Method, Matrix Formation - Similarity Coefficient Method, Sorting-based Algorithms, Bond Energy Algorithm, Cost Based method, Cluster Identification Method, Extended CI Method. Knowledge Based Group Technology - Group Technology in Automated Manufacturing System. Structure of Knowledge based system for group technology (KBSCIT) — Data Base, Knowledge Base, Clustering Algorithm.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CAD 1210	
Course Title: Intelligent Manufacturing Systems(Elective-IV)	
CO-1	Students will get knowledge on Computer Integrated Manufacturing Systems and Manufacturing Communication Systems.
CO-2	Students will be able to learn the Components of Knowledge Based Systems, Machine Learning and Knowledge Based System for Equipment Selection.
CO-3	Students will be able to understand and solve the group technology problems by using knowledge based system.

SYLLABUS: COMPUTER AIDED MANUFACTURING LAB (M17 CAD 1211)

Manual and computer assisted part programming exercises on CNC machine tools. Surface generation, Tool selection, NC code generation and Tool path simulation for turning and milling operations using CAM packages like CATIA, Gibbs CAM, Master CAM. Robot programming off-line and on-line.

Course Outcomes for First Year Second Semester Course	
Course Code:M17 CAD 1211	
Course Title: COMPUTER AIDED MANUFACTURING LAB	
CO-1	Illustrate the importance of NC and CNC technology in manufacturing industry.
CO-2	Generate Part Programming with application of CAD/CAM systems in particular for complex models.
CO-3	Identify and select proper NC toolings

Regulation: R17			M.Tech. III - Semester			
MECHANICAL ENGINEERING(CAD/CAM) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17CAD2101	Comprehensive Viva-Voce	Viva-Voce	2	50	-	50
M17CAD2102	Seminar-I	Oral Presentation	2	50	-	50
M17CAD2103	Project Work Part-I	Review	16	50	-	50
		Total	**20**	**150**	**-**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

3. The Project Work Part-II should be submitted at the end of 4th semester and it will be evaluated through Viva–Voce examination by a committee consisting of External Examiner, Head of the Department, Project guide and PG coordinator. The marks shall be awarded in the ratio of 40, 20, 20 and 20 Marks by the members respectively.

Regulation: R17			M.Tech. III - Semester			
MECHANICAL ENGINEERING(CAD/CAM) (under Choice Based Credit System / Elective Course System)						
SCHEME OF INSTRUCTION &EXAMINATION (With effect from 2017-18 admitted Batch onwards)						
Course Code	**Course**	**Scheme of Examination**	**C**	**Int**	**Ext**	**Total**
M17 CAD 2201	Seminar-II	Oral presentation	2	50	-	50
M17 CAD 2202	Project Work Part-II	Viva-voce	18		100	100
Total			**20**	**50**	**100**	**150**

1. The viva-voce for Seminar-II shall be held with the Project Guide, PG coordinator, and Head of the Department. The marks shall be awarded in the ratio of 20, 10 and 20 Marks by the members respectively.

2. A publication of a paper on the thesis work in a National/International Journal at the end of 4th semester is mandatory for the submission of thesis work.

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