## Highlighted Employability Courses (B.Tech) for the Academic Year - 2019-2020

# INDEX

# CIVIL ENGINEERING

**CIVIL ENGINEERING**

**SYLLABUS: ENGLISH (B19HS1101)**

(Common to CE, CSE, ECE, EEE, IT&ME)

**UNIT-I: Lesson: A Drawer full of happiness** from *Infotech English*, Maruthi Publications.

**Listening:** Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

**Speaking:** Self-introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

**Reading:** Skimming text to get the main idea. Scanning to look for specific pieces of information.

**Reading for Writing:** Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

**Vocabulary:** Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

**Grammar:** Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

**Pronunciation**: Vowels, consonants, plural markers and their realizations.

**UNIT-II: Lesson-: Nehru's letter to his daughter, Indira on her birthday** from *Infotech English*, Maruthi Publications**.**

**Listening:** Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

**Speaking**: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

**Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

**Reading for Writing**: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

**Vocabulary:** Technical vocabulary from across technical branches (20words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

**Grammar:** Articles, prepositions, conjunctions, use of synonyms and antonyms.

**Pronunciation**: Past tense markers, word stress-di-syllabic words.

**UNIT-III: Lesson: Stephen Hawking-Positivity' Benchmark'** from *Infotech English*, Maruthi Publications.

**Listening:** Listening for global comprehension and summarizing what is listened to both in speaking and writing.

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**Speaking:** Discussing specific topics in pairs or small groups and reporting whatis discussed.

Functional English: complaining and apologizing.

**Reading:** Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

**Reading for Writing:** Letter writing- types, format and principles of letterwriting, E-mail etiquette, writing a Resume/CV and covering letter.

**Vocabulary:** Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, wordapplications, sequencing of words.

**Grammar:** Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).

**Pronunciation:** Word stress-poly-syllabic words.

**UNIT-IV: Lesson: Liking a Tree, Unbowed: Wangari Maathai biography** from *Infotech English*, Maruthi Publications.

**Listening:** Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

**Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

**Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

**Reading for Writing:** Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.

**Grammar:** Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.

**Pronunciation**: Contrastive Stress.

**UNIT-V: Lesson: Stay Hungry–Stay Foolish** from *Infotech English*, Maruthi Publications.

**Listening:** Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

**Speaking:** Formal oral presentations on topics from academic contexts–with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

**Reading:** Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.



**Reading for Writing:** Report writing, writing academic proposals- writing researcharticles: format a

and style.

**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

**Grammar:** Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).

**Pronunciation:** Stress in compound words.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1101** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

## SYLLABUS: MATHEMATICS-I (B19BS1101)
## (LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS)
### (Common to All Branches)

**UNIT-I: Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II: Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types. Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electricalcircuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS – I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform, inverse Laplace transform and solve linear ODE |

## SYLLABUS: ENGINEERING PHYSICS (B19 BS1103)

(Common to CE & ME)

**UNIT-I: SCIENCE OF SOLIDS –CRYSTALLOGRAPHY AND NANOMATERIALS: Crystallography:** Basis and lattice, Crystal systems, Bravais lattice, Characteristics of unitcell, Atomic packing fraction for S.C, B.C.C, F.C.C lattices, Miller indices – representation of lattice planes, Diffraction of x rays in Crystals and Bragg's law.

**Nanomaterial's** : Introduction, Salient features of Nano materials, Synthesis methods – Ball milling, Condensation, Chemical Vapour Deposition, Sol – Gel. Characterization techniques for nano materials, Carbon Nano Tubes (C N T s), Applications of Nanomaterials

**UNIT-II: ACOUSTICS & ULTRASONICS**

**Acoustics:** Introduction – Reverberation time – Sabine's formula (Derivation using growth and decay method) – absorption coefficient and its determination – factors affecting acoustics of buildings and their remedies.

**Ultrasonics**: Production of ultrasonics by Magnetostriction and piezoelectric methods – Detection of ultrasonics - acoustic grating – Non-Destructive Testing – pulse echo system through transmission and reflection modes – Applications.

**UNIT-III: ELASTICITY**

**Elasticity:** Stress, Strain; Hooke's law, stress – strain curve, generalized Hooke's law with and without thermal strain for isotropic materials, different types of moduli and theirrelations, bending of beams – Bending moment of a beam – Depression of c

**UNIT-IV: MAGNTICS AND DIELECTRICS**

**Magnetics:** Introduction – Magnetic dipole moment – Magnetization – Magnet'c susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton– Classification of magnetic materials (Dia, Para and Ferro) – Domain concept of Ferromagnetism – Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials.

**Dielectrics**: Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz internal field – Claussius-Mossoti equation – Frequency dependence of polarization – Applications of dielectrics.

**UNIT-V: LASERS AND OPTICAL FIBERS**

**Lasers:** Introduction, Interaction of radiation with matter, conditions for light amplification, Einstein's relations. Requirements of lasers device, Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

**Fiber Optics:** Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1103** | |
| **Course Title: ENGINEERING PHYSICS** | |
| **CO-1** | Explain the structure of solids and their determination |
| **CO-2** | Demonstrate the synthesis methods and applications of nano materials |
| **CO-3** | Understand the concepts of elasticity and different types of moduli and their relation |
| **CO-4** | Explain the sound propagation in buildings and related aspects |
| **CO-5** | Characterize the magnetic and dielectric materials from their basic behaviour and learn their applications. |
| **CO-6** | Understand the basics of modern technologies ultrasonics, lasers and opticalfibers and their applications in various fields |

## SYLLABUS: ENGINEERING MECHANICS (B19CE1101)
### (Civil Engineering)

**UNIT-I:** Concurrent forces in a plane, parallel forces in a plane, centroid, moment of inertia, radius of gyration, parallel axis theorem, principle axes.

**UNIT-II:** 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.

**UNIT-III:** Principle of virtual work, stable and unstable equilibrium – efficiency – beams & pulley systems.

**UNIT-IV:** Kinematics of particles – rectilinear & curvilinear motion, rectangular components, tangential & normal components.
Kinetics of particles – Newton's second law, Energy method, Impulse & momentummethod.

**UNIT-V:** Kinematics of rigid bodies – translation, rotation, plane motion, instantaneous centre of rotation.
Plane motion of rigid bodies – forces & acceleration, D'Alembert's principle, energy &momentum methods.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19CE1101** | |
| **Course Title: ENGINEERING MECHANICS** | |
| **CO-1** | Apply laws of mechanics for various force conditions and properties of bodies |
| **CO-2** | Apply laws of forces for general cases in plane |
| **CO-3** | Apply principle of virtual work for various equilibrium conditions |
| **CO-4** | Apply laws of kinematics and kinetics to particles |
| **CO-5** | Apply laws of kinematics and kinetics to rigid bodies |

## SYLLABUS: ENGINEERING DRAWING (B19ME1101)

(Common to CE, EEE & ME)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only),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: B19ME1101** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

## SYLLABUS: ENGINEERING PHYSICS LAB (B19BS1106)
**(Common to CE& ME)**

1. Determination of the Rigidity modulus of elasticity of a material - Torsional pendulum.
2. Determination Young's modulus by single Cantilever oscillations method.
3. Verification of the laws of vibrations in stretched strings – Sonometer
4. Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Determination of Magnetic susceptibility by Quinke's method.
6. Determination of velocity of sound - Volume Resonator method.
7. Determination of dielectric constant by charging and discharging method.
8. Determination of wave length of lasers by diffraction grating
9. Determination of wave length of light from a source using Diffraction Grating by Normal Incidence method.
10. Determination of radius of curvature of Plano convex lens – Newton's Rings.
11. Determination of the thickness of a thin spacer using interference – Air Wedge method.
12. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
13. Resolving power of a grating.
14. Determination of Temperature Coefficient of Resistance of a thermistor.
15. Determination of resistivity of semiconductors by Four probe method.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1106** | |
| **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 LAB (B19HS1102)
### (Common to All Branches)

**UNIT-I:** Pronunciation

Letters and Sounds

The Sounds of English

Phonetic Transcription

**UNIT-II:** Past tense markers

Word stress-di-syllabic words

Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms

Stress in compound words

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19CE1102)
**(Civil Engineering)**

**Apply Design Thinking on the following Streams to**

**Project Stream 1**:

Electronics, Robotics, IOT and Sensors

**Project Stream 2**:

Computer Science and IT Applications

**Project Stream 3**:

Mechanical and Electrical tools

**Project Stream4**:

Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources,Agriculture, Environmental science and other fields of engineering.

**TASKS TO BE DONE:**

**Task 1: Everyone is a Designer**

- Understand class objectives & harness the designer mindset

**Task 2: The Wallet/Bag Challenge and Podcast**

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

**Task 3: Teams & Problems**

- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

**Task 4: Empathizing**

- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

**Task 5: Ideating**

- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

**Task 6: Prototyping**

- Continue Design Challenge and learn how to create effective prototypes

- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

**Task 7: Testing**

- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

**Task 8:**

- Final Report Submission and Presentation

## CIVIL ENGINEERING

## SYLLABUS: MATHEMATICS – II (B19BS1201)

## (NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)

(Common to CE, EEE, & ME)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton- Raphson method. Trapezoidal rule, Simpson's 1/3 rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth orderRunge-Kutta method.

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.
Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method. Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation. Solutions of Linear homogeneous and non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the Alembert'ssolution, one- dimensional heat equation

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1201** | |
| **Course Title: MATHEMATICS–II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numerically certain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian. |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation. |

# SYLLABUS: MATHEMATICS-III (B19BS1202)

(Common to CE, CSE, ECE, EEE & IT)

**UNIT-I: 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.

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

**UNIT-III: Single and Multiple integrals Beta** and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.

Double and triple integrals, change of variables, Change of order of integration.Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation:** Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrigational vector fields, 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) andrelated Problems.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1202** | |
| **Course Title: MATHEMATICS-III** | |
| **CO-1** | Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.. |
| **CO-2** | Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage |
| **CO-3** | Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.. |
| **CO-4** | Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage |
| **CO-5** | Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the basic concepts of semiconductors and liquid crystals for engineering applications.. |
| **CO-6** | Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage |

## SYLLABUS: ENGINEERING CHEMISTRY (B19BS1204)

(Common to CE & ME)

**UNIT-I: Water and its treatment:** Introduction – source of water – impurities of water – Hardness of water – Estimation of water hardness by EDTA method – Boiler troubles: Sludge and scale formation ion boilers; caustic embrittlement; Boiler corrosion; Priming and foaming – Water softening: Lime – Soda Process, Zeolite Process; Demineralization by Ion – Exchange Process. Muncipal Water treatment – Desalination of Brackish water: Electrodialysis; Reverse osmosis. Indian standards and WHO standards of drinking water. Design of drinking water plant

**UNIT-II: Fuels and Lubricants:** Fuels: Introduction – classification of fuels – calorific value: HCV and LCV; Determinationof calorific value of solid fuel 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; cracking FB MB 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: Corrosion and its Prevention:** Definition- Theories of corrosion (i) Dry Corrosion (ii) Wet Corrosion. Types of Electrochemical corrosion: Pitting corrosion, Differential variation corrosion galvanic corrosion, Stress corrosion. Factors influencing corrosion; Protection from corrosion- material selection and design cathodic Protection, corrosion inhibitors Protective coatings – Galvanizing, Tinning. Inorganic coatings – Anodizing; organic coatings – Paints Varnishes – Special Paints.

**UNIT-IV: High Polymers and Plastics; Rubber & Elastomers** Definition – Types of polymerisation – Free radical mechanism of addition Polymerisation; - Plastics as engineering materials, Thermo Plastics and thermosetting Plastics – compounding of Plastics – Fabrication of Plastics – Preparation, Properties and applicationsof Polyethene , PVC, Nylon 6,6; - Bullet Proof Plastics: Kelvar and Polycarbonate – Fiber reinforced Plastics – Conducting Polymers; Biodegradable Polymers – PHBV; Nylon-2 nylon – 6; Natural rubber: Vulcanization – compounding of rubber, Preparation, Properties and applications of Bu Na – S; Bu Na – N.

**UNIT-V: Building & Construction Materials**

**Ceramics**:- Definition – Characteristics – Classification of Ceramics – Application ofCeramics.

**Portland Cement:-** Manufacture of Portland Cement – Setting and hardening of Portland Cement – Mortar-Concrete – Reinforced Cement Concrete(RCC); Decay of Concrete – Special Cements.

**Refractories**:- Definition – Characteristics – Classification – Properties and failure ofrefractories.

**Insulators:** Thermal and electrical insulators.

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| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19BS1204** | |
| **Course Title: ENGINEERING CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: PROGRAMMING FOR PROBLEM SOLVING USING C (B19CS1201)

(For CE, EEE & ME)

**UNIT-I: Introduction to Computers:** Computer Systems, Computing Environments, Computer languages**,** Creating and running Programs, Computer Numbering System, Storing Integers,Storing Real Numbers

**Introduction to the C Language:** Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

**Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

**UNIT-II: Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection,Multiway Selection, More Standard Functions

**Repetition:** Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

**UNIT-III: Arrays:** Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

**Strings:** String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

**Enumerated, Structure, and Union:** The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application

**UNIT-IV: Pointers:** Introduction, Pointers to pointers, Compatibility, L value and R value

**Pointer Applications:** Arrays, and Pointers, Pointer Arithmetic and Arrays, MemoryAllocation Function, Array of Pointers, Programming Application

**Processor Commands**: Processor Commands

**UNIT-V: Functions:** Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointersto Functions, Recursion

**Text Input / Output:** Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

**Binary Input / Output:** Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS1201** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C** | |
| **CO-1** | Students will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program. |
| **CO-2** | Students will learn to use different operators, data types and loops for developing C Programs. |
| **CO-3** | Students will able to write programs using Arrays, Strings, enumerated types, Structure and Union. |
| **CO-4** | Students will able to design and implement programs to analyze the different pointer applications. |
| **CO-5** | Students will able to decompose a problem into functions and to develop modular reusable code. |

## SYLLABUS: COMPUTER AIDED ENGINEERING DRAWING (B19CE1201)

(For CE)

**UNIT-I: PROJECTIONS OF SOLIDS**: Projections of Regular Solids inclined to both planes –Auxiliary Views.

**UNIT-II: SECTIONS OF SOLIDS:** Sections and Sectional views of Right Regular Solids – Prism,Cylinder, Pyramid, Cone – Auxiliary views.

**DEVELOPMENT OF SOLIDS:** Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

**UNIT-III: INTERPENETRATION OF RIGHT REGULAR SOLIDS**: Intersection of Cylinder VsCylinder, Prism Vs Prism and Cylinder Vs Cone.

**PERSPECTIVE PROJECTIONS:** Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

**UNIT-IV: INTRODUCTION TO COMPUTER AIDED DRAFTING:** Generation of points, lines, curves, polygons, dimensioning. Types of modeling: object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,

**VIEW POINTS AND VIEW PORTS:** view point coordinates and view(s) displayed, examples to exercise different options like save, restore and delete.

**UNIT-V: COMPUTER AIDED SOLID MODELING:** Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling ofBuilding & Building Parts.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CE1201** | |
| **Course Title: BUILDING MATERIALS AND CONCRETE TECHNOLOGY** | |
| **CO-1** | Apply principles of drawing to draw the projections of solids. |
| **CO-2** | Apply principles of drawing to draw sections of solids and sectional views. |
| **CO-3** | Apply principles of drawing to draw the development of solids |
| **CO-4** | Apply the principles of drawing to draw the intersection of right regular solids. |
| **CO-5** | Apply the principles of drawing to draw the perspective views of points, lines, plane figures and simple solids. |
| **CO-6** | Draw isometric and orthographic drawings using CAD packages. |

## SYLLABUS: ENGINEERING CHEMISTRY LAB (B19BS1207)

(Common to CE & ME)

**LIST OF EXPERIMENTS:**

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.Conductometric 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 of Acid value of oil.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1207** | |
| **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 real time 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: COMMUNICATION SKILLS LAB (B19HS1202)

(Common to CE, ECE, EEE & ME)

**UNIT-I:** JAM, Common Errors Neutralizing accent

**UNIT-II:** Telephonic Etiquette,Role Plays, Poster Presentations

**UNIT-III:** Presentation SkillsPublic Speaking Data Interpretation

**UNIT-IV:** Group Discussion Do's and Don'ts

**UNIT-V:** Curriculum Vitae Covering Letter Interview Skills Mock Interviews, FAQ's.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS1202** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

## SYLLABUS: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (B19CS1204)

(Common to CE, EEE & ME)

1. Exercise 1:
    1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
    2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches andwidth of 5 inches.
    3. Write a C program to display multiple variables.
2. Exercise 2:
    1. Write a C program to calculate the distance between the two points.
    2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and pis even If q is greater than r and s is greater than p and if the sum of r and s is greater than the sumof p and q print "Correct values", otherwise print "Wrong values".
3. Exercise 3:
    1. Write a C program to convert a string to a long integer.
    2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
    3. Write a C program to calculate the factorial of a given number.
4. Exercise 4:
    1. Write a program in C to display the n terms of even natural number and their sum.
    2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 .1/n terms.
    3. Write a C program to check whether a given number is an Armstrong number or not.
5. Exercise 5:
    1. Write a program in C to print all unique elements in an array.
    2. Write a program in C to separate odd and even integers in separate arrays.
    3. Write a program in C to sort elements of array in ascending order.
6. Exercise 6:
    1. Write a program in C for multiplication of two square Matrices.
    2. Write a program in C to find transpose of a given matrix.
7. Exercise 7:
    1. Write a program in C to search an element in a row wise and column wise sorted matrix.
    2. Write a program in C to print individual characters of string in reverse order.
8. Exercise 8:
    1. Write a program in C to compare two strings without using string library functions.

2. Write a program in C to copy one string to another string.

9. Exercise 9:
   1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
   2. Write a program in C to demonstrate how to handle the pointers in the program.
10. Exercise 10:
   1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
   2. Write a program in C to add two numbers using pointers
11. Exercise 11:
   1. Write a program in C to add numbers using call by reference.
   2. Write a program in C to find the largest element using Dynamic Memory Allocation
12. Exercise 12:
   1. Write a program in C to swap elements using call by reference.
   2. Write a program in C to count the number of vowels and consonants in a string using a pointer.
13. Exercise 13:
   1. Write a program in C to show how a function returning pointer.
   2. Write a C program to find sum of n elements entered by user. To perform this program, allocatememory dynamically using malloc( ) function
14. Exercise 14:
   1. 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 program.
   2. Write a program in C to convert decimal number to binary number using the function.
15. Exercise 15:
   1. Write a program in C to check whether a number is a prime number or not using the function.
   2. Write a program in C to get the largest element of an array using the function.
16. Exercise 16:
   1. Write a program in C to append multiple lines at the end of a text file.
   2. Write a program in C to copy a file in another name.
   3. Write a program in C to remove a file from the disk.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1204** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able design and development of C problem solving skills . |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program. |

## SYLLABUS: WORK SHOP PRACTICE LAB (B19ME1205)

(Civil Engineering)

**LIST OF EXPERIMENTS:**

**CARPENTRY**

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

**FITTING**

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

**TIN SMITHY**

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 THREE exercises to be done from each trade.**

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME1205** | |
| **Course Title: WORK SHOP PRACTICE LAB** | |
| **CO-1** | Apply wood working skills in real world applications. |
| **CO-2** | Build different parts with metal sheets in real world applications. |
| **CO-3** | Apply fitting operations in various applications. |
| **CO-4** | Apply different types of basic electric circuit connections. |

## CIVIL ENGINEERING

## SYLLABUS: MATHEMATICS IV (B19BS2102)

(Complex Variables & Statistical Methods)

(Common to CE & EEE)

**Pre-requisites: Basic concepts of Probability theory and Baye's Theorem**

**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 on the review portion).** Limit and continuity of a function of a complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, determine an analytic function based on the knowledge of its real and imaginary parts, 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.

**UNIT-II: Complex Integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula. Expansion of a function in a Taylor series, McLaren series and Laurent series. Types of singularities, Residues, Cauchy's residue theorem. Evaluation of real definite integrals –integration around unit circle (Theorems without proofs).

**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:** A brief review of random variables, Binomial, Poisson and Normal distributions, definitions of pmf/ pdf, notation, mean, variance, moment generating function. Fitting of Binomial or Poisson distributions for a given frequency distribution.

**UNIT-V: Sampling theory and Testing of Hypothesis:**

**Sampling theory:** Introduction, population and samples, Sampling distribution, standard error, central limit theorem (without proof), level of significance, procedure of testing of hypothesis.

**Large samples:** Testing of hypothesis for single proportion and two proportions.

**Small samples:** Degrees of freedom, Students' t- distribution, t-test for single mean, two means; Chi- squared distribution, test for goodness of a fit.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19BS2102** | |
| **Course Title: MATHEMATICS IV** | |
| **CO-1** | Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics |
| **CO-2** | Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals. |
| **CO-3** | Formulate and solve linear difference equations. |
| **CO-4** | Use Z-transforms to solve linear difference equations with constant coefficients. |
| **CO-5** | Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution. |
| **CO-6** | Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples. |

**SYLLABUS: MECHANICS OF SOLIDS (B19CE2101)**
**(LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS)**
**(Common to All Branches)**

**UNIT-I:** 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 appliedand impact loads – simple applications

**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)

**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 loadsand combination of these loads – point of contraflexure – Relationship b/w S.F, BM andrate of loading.

**UNIT-III: Flexural Stresses & Shear Stresses:**

*Flexural Stresses*: Theory of simple Bending – Assumptions–Derivation of Bending equation - $\left(\frac{M}{I}=\frac{f}{y}=\frac{E}{R}\right)$ Neutral axis – Determination of bending stresses – section modulus of rectangular & Circular sections (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 like rectangular, circular, Triangular, I, T, angle sections, built up beams, Definition of shear centre. **Torsion of Circular Shafts:** Theory of pure Torsion –Derivation of Torsion equation $\left(\frac{T}{I}=\frac{c\max}{R}=\frac{G\theta}{l}\right)$– 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-IV: Deflections of Beams**: (i) Cantilever (ii) Simply supported and (iii) Over hanging beams using (a) Double integration and (b) Macaulay's method

**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.

**Thin & Thick 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

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CE2101** | |
| **Course Title: MECHANICS OF SOLIDS** | |
| **CO-1** | Summarize the behavior of basic materials under the influence of different external loading conditions and support conditions and also to determine the principal stresses & strains under different loadings. |
| **CO-2** | Determine shear Force and Bending moments in statically determinate Beams and draw the Diagrams. |
| **CO-3** | Calculate the bending stresses, shear stresses, torsional stresses in structural members and also stiffness of springs. |
| **CO-4** | Examine the basic methods to find slope and deflection of beams subjected to loads. |
| **CO-5** | Determine the crippling load for columns with different end conditions and calculate the stresses in Thin & Thick cylinders |

## SYLLABUS: FLUID MECHANICS (B19CE2102)

**UNIT-I: Basic Fluid Properties:** Definition of Fluid, basic properties of fluid, Viscosity - Newton'sLaw 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: Buoyancy and Floatation**: Archimedes Principle- Buoyancy & Floatation - Stability of Floating Bodies- Centre of Buoyancy – Meta centric 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. Venturimeter, orifice meter and nozzle meter.

**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. Turbulent flow: shear stress in Turbulent flow, prandtl mixing length theory, Velocity distribution in pipes, Hydro-dynamically smooth and rough boundaries, Velocity distribution in rough and smooth pipes, Resistance of smooth and rough pipes.

**UNIT-V: Flow through pipes**: Flow measurement through pipes –head 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 First Semester Course | |
|---|---|
| **Course Code: B19CE2102** | |
| **Course Title: FLUID MECHANICS** | |
| **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 velocity of fluid flows, 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 using control volume approaches. |
| **CO-5** | Calculate the force exerted by the fluid on bends, nozzles using impulse momentum principle |
| **CO-6** | Determine the shear stress, Velocity, loss of head in Laminar flow through circular pipes and Turbulent flow for rough and smooth pipes |
| **CO-7** | Analyze the steady laminar and turbulent flows in pipes and solve the pipe networks problems |

## SYLLABUS: BUILDING MATERIALS CONSTRUCTION AND PLANNING (B19CE2103)

**UNIT-I: Stones, Bricks and Tiles:** Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

**UNIT-II: Masonry:** Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. Wood: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel and Aluminium

**UNIT-III: Lime and Cement:** Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types ofcement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

**UNIT-IV: Building Components:** Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

**Planning of Residential and Public buildings, specifications with line diagram**

**UNIT-V: Finishings and Aggregates:** Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering. Paints: Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings. **Aggregates -** Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CE2103** | |
| **Course Title: BUILDING MATERIALS CONSTRUCTION AND PLANNING** | |
| **CO-1** | Identify different building materials and their importance in building construction |
| **CO-2** | Differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions |
| **CO-3** | Learnt the importance of building components and finishings. |
| **CO-4** | Draw developed plan, elevation, section, site plan for residential and public buildings. |
| **CO-5** | know the classification of aggregates, sieve analysis and moisture content usually required in building construction. |

## SYLLABUS: SURVEYING (B19CE2104)

**UNIT-I: Introduction and Basic Concepts**: Introduction, Objectives, classification and principles of surveying, surveying accessories. Introduction to Compass, leveling and Plane table surveying

**Measurement of Distances and Directions Linear distances-** Approximate methods,Direct Methods- Chains-Tapes, ranging, Tape corrections

**Prismatic Compass-** Bearings, included angles, Local Attraction, Magnetic Declination, and dip – W.C.B systems and Q.B. system of locating bearings (simple problems only)

**UNIT-II: Leveling-** Types of levels, temporary and permanent adjustments, methods of leveling, booking and Determination of levels, Effect of Curvature of Earth and Refraction **Contouring-** Characteristics and uses of Contours, methods of contour surveying.

**Areas -** Determination of areas consisting of irregular boundary and regular boundary.

**Volumes** -Determination of volume of earth work in cutting and embankments for level section, volume of borrow pits

**UNIT-III: Theodolite Surveying**: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrically leveling when base is accessible and inaccessible.

**Traversing:** Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements. (simple problems only)

**UNIT-IV: Tachometric Surveying:** Principles of Tachometry, stadia and tangential methods ofTachometry

**Curves**: Types of curves and their necessity, elements of simple, compound, reverse curves

**UNIT-V: Modern Surveying Methods:** Total Station and Global Positioning System. : Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations. Applications of GPS, Photogrammetric surveying applications and the limitations

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CE2104** | |
| **Course Title: SURVEYING** | |
| **CO-1** | Apply the knowledge to calculate angles, distances and levels |
| **CO-2** | Identify data collection methods and prepare field notes |
| **CO-3** | Understand the working principles of survey instruments, measurement errors and corrective |
| **CO-4** | Measures Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment andmethodologies |

# SYLLABUS: SURVEYING FIELD WORK (B19CE2106)

## LIST OF EXPERIMENTS:

1. Study of chains and its accessories, Aligning, Ranging and Chaining and Chain Traversing
2. Compass Traversing – Measuring Bearings & arriving included angles
3. Levelling: Longitudinal & Cross section levelling for an open traverse
4. Theodolite: Distance between two in-accessible points by theodolite
5. Trigonometric Leveling - Heights and distance problem
6. Determination of Heights and distance using Principles of tacheometric surveying
7. Setting out a simple circular curve
8. Determine of area using total station
9. Traversing using total station
10. Contouring using total station
11. Stake out using total station
12. Distance, gradient, diff, height between two inaccessible points using total station

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19CE2106** | |
| **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: STRENGTH OF MATERIALS LAB (B19CE2107)

### LIST OF EXPERIMENTS:

1. Tension test on Mild Steel bar
2. Tension test on HYSD Steel bar
3. To determine Compressive strength of wood (parallel and perdicular to grains)
4. To determine Modulus of rigidity of a spring
5. To determine Brinell's hardness & Rockwell hardness on mild steel and Aluminium Specimen
6. To determine Vicker's hardness on mild steel and Aluminium Specimen
7. To determine Impact strength of mild steel by Charpy test
8. To determine Impact strength of mild steel by Izod test
9. To determine shear strngth of mild steel by Double shear test
10. Bending test on simply supported Steel /Wooden beams
11. Bending test on cantilever Steel / Wooden beams
12. Draw linear arch for the given two/three point loads
13. Verification of Maxwell's reciprocal theorem on simply supported beam

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CE2107** | |
| **Course Title: STRENGTH OF MATERIALS LAB** | |
| **CO-1** | Conduct test and find Physical properties of steel and wood |
| **CO-2** | Design the specimens for assessing a particular property of the materials with available machines |
| **CO-3** | Decide the range of machine and set the machine accordingly by suitable modifications |
| **CO-4** | Design experiments making use of various techniques of load measuring or deformation mesuring instruments |

## SYLLABUS: CONSTITUTION OF INDIA (B19MC2103

**UNIT-I:** Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

**Learning Outcomes: After completion of this unit student will**

Understand the concept of Indian constitution

Apply the knowledge on directive principle of state policy

Analyze the History, features of Indian constitution

Evaluate Preamble Fundamental Rights and Duties

**UNIT-II:** Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha, The Supreme Court and High Court: Powers and Functions;

**Learning outcomes:-After completion of this unit student will**

Understand the structure of Indian government

Differentiate between the state and central government

Explain the role of President and Prime Minister

Know the Structure of supreme court and High court

**UNIT-III:** State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

**Learning outcomes:-After completion of this unit student will**

Understand the structure of state government

Analyze the role Governor and Chief Minister

Explain the role of state Secretariat

Differentiate between structure and functions of state secretariat

**UNIT-IV:** Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Pachayati Raj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

**Learning outcomes:-After completion of this unit student will**Understand the local Administration

Compare and contrast district administration role and importance

Analyze the role of Myer and elected representatives of Municipalities

Evaluate Zillapanchayat block level organization

**UNIT-V:** Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

**Learning outcomes:-**After completion of this unit student will Know the role of Election Commission apply knowledge Contrast and compare the role of Chief Election commissioner and Commissionerate
Analyze role of state election commission Evaluate various commissions of viz SC/ST/OBC and women

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19MC2103** | |
| **Course Title: CONSTITUTION OF INDIA** | |
| **CO-1** | Understand historical background of the constitution making and its importance for building a democratic India. |
| **CO-2** | Understand the functioning of three wings of the government ie., executive, legislative and judiciary. |
| **CO-3** | Understand the value of the fundamental rights and duties for becoming good citizen of India. |
| **CO-4** | Analyze the decentralization of power between central, state and local self-government. |
| **CO-5** | Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. |
| **CO-6** | a) Know the sources, features and principles of Indian Constitution.<br>b) Learn about Union Government, State government and its administration.<br>c) Get acquainted with Local administration and Panchayati Raj.<br>d) Be aware of basic concepts and developments of Human Rights.<br>e) Gain knowledge on roles and functioning of Election Commission. |

## CIVIL ENGINEERING
## SYLLABUS: ENGINEERING GEOLOGY (B19CE2201)

**UNIT-I: Introduction:** Branches of Geology, Importance of Geology in Civil Engineering with case studies. **Weathering:** Weathering of rocks, Geological agents, weathering process of Rock, Riversand geological work of rivers

**UNIT-II: Mineralogy and Petrology:** Definitions of mineral and rock-Different methods of study of mineral and rock. Physical properties of minerals and rocks for Megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite.

Ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite.

Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their Megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

**UNIT-III: Structural Geology:** Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

**UNIT-IV: Ground Water:** Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

**Earthquakes and Land Slides:** Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas.

Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

**Geophysics:** Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

**UNIT-V: Geology of Dams, Reservoirs and Tunnels:** Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geologicalconsiderations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunneling, effects, Lining of Tunnels. Influence of Geology for successful Tunneling

| **Course Outcomes for Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19CE2201** | |
| **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 geologyin complex projects in and on solid rock |

## SYLLABUS: STRUCTURAL ANALYSIS - I (B19CE2202)

**UNIT-I: Deflections of Beams:** By using (i) Moment area method (ii) Conjugate beam method (iii) Unit load method (iv)Castigliano"s theorem-II.

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-II. (b) Trusses (having 9 members or less) using (i) Unit load method, (ii) Castigliano's theorem-II.

**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 ofloading; Effect of sinking of support; effect of Rotation of a support; BMD for fixed beam

**UNIT-III: Continuous Beams:** Analysis of continuous beams by

Theorem of three moments

Slope deflection method

Moment distribution method

Kani's method.

**UNIT-IV: Influence Lines and Moving Loads for beams:** Definition – Influence line for Reaction, SF and BM in case of simply supported and over hanging beams-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: Influence Lines for Trusses:** Influence lines for axial forces in the members of determinate trusses (Through type anddeck type bridges. Maximum axial force due to moving concentrated loads and UDL

| Course Outcomes for Second Year Second Semester Course | |
|---|---|
| **Course Code: B19CE2202** | |
| **Course Title: STRUCTURAL ANALYSIS - I** | |
| **CO-1** | Determine deflections in determinate beams, frames& trusses by different methods and apply strain energy concept |
| **CO-2** | Analyze propped cantilever and fixed beams for BM and SF. |
| **CO-3** | Analyze different Continuous beams for BM and SF by different methods of analysis |
| **CO-4** | Determine reactions, BM & SF in beams subjected to moving loads using ILD |
| **CO-5** | Determine axial forces in trusses by using influence lines |

## SYLLABUS: CONCRETE TECHNOLOGY (B19CE2203)

**UNIT-I: 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, 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 – Grading curves – Grading of fine & coarse Aggregates. Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size.Quality of mixing water

**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 temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete , Ready mixed concrete, Shotcrete.

**UNIT-III: HARDENED CONCRETE:** Water / Cement ratio – Abram's Law – Gelspace ratio –Nature of strength of concrete –Maturity concept – Strength in tension & compression –Factors affecting strength – Relation between compression & tensile strength - Curing.

**TESTING OF HARDENED CONCRETE:** Compression tests – Tension tests – Factorsaffecting 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 – Relationbetween creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

**UNIT-V: MIX DESIGN:** Factors in the choice of mix proportions – Durability of concrete – 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 BIS method of mix design.

**SPECIAL CONCRETES:** 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 healing concrete.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CE2203** | |
| **Course Title: CONCRETE TECHNOLOGY** | |
| **CO-1** | Understand the basic ingredients like cement, sand and pebbles |
| **CO-2** | Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour by conducting tests |
| **CO-3** | Testing the hardened concrete for different properties |
| **CO-4** | Evaluate elasticity, shrinkage and creep properties |
| **CO-5** | Design the concrete mix by standard mix designs and familiarize the basic concepts of special concrete, their production and applications |

## SYLLABUS: HYDRAULICS AND HYDRAULIC MACHINERY (B19CS1201)

(For CE, EEE & ME)

**UNIT-I: Introduction to Computers:** Computer Systems, Computing Environments, Computer languages**,** Creating and running Programs, Computer Numbering System, Storing Integers,Storing Real Numbers

**Introduction to the C Language:** Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

**Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

**UNIT-II: Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection,Multiway Selection, More Standard Functions

**Repetition:** Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

**UNIT-III: Arrays:** Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

**Strings:** String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

**Enumerated, Structure, and Union:** The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application

**UNIT-IV: Pointers:** Introduction, Pointers to pointers, Compatibility, L value and R value

**Pointer Applications:** Arrays, and Pointers, Pointer Arithmetic and Arrays, MemoryAllocation Function, Array of Pointers, Programming Application

**Processor Commands**: Processor Commands

**UNIT-V: Functions:** Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointersto Functions, Recursion

**Text Input / Output:** Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

**Binary Input / Output:** Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS1201** | |
| **Course Title: HYDRAULICS AND HYDRAULIC MACHINERY** | |
| **CO-1** | Students will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program. |
| **CO-2** | Students will learn to use different operators, data types and loops for developing C Programs. |
| **CO-3** | Students will able to write programs using Arrays, Strings, enumerated types, Structure and Union. |
| **CO-4** | Students will able to design and implement programs to analyze the different pointer applications. |
| **CO-5** | Students will able to decompose a problem into functions and to develop modular reusable code. |

## SYLLABUS: COMPUTER AIDED ENGINEERING DRAWING (B19CE1201)

(For CE)

**UNIT-I: PROJECTIONS OF SOLIDS**: Projections of Regular Solids inclined to both planes –Auxiliary Views.

**UNIT-II: SECTIONS OF SOLIDS:** Sections and Sectional views of Right Regular Solids – Prism,Cylinder, Pyramid, Cone – Auxiliary views.

**DEVELOPMENT OF SOLIDS:** Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

**UNIT-III: INTERPENETRATION OF RIGHT REGULAR SOLIDS**: Intersection of Cylinder VsCylinder, Prism Vs Prism and Cylinder Vs Cone.

**PERSPECTIVE PROJECTIONS:** Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

**UNIT-IV: INTRODUCTION TO COMPUTER AIDED DRAFTING:** Generation of points, lines, curves, polygons, dimensioning. Types of modeling: object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,

**VIEW POINTS AND VIEW PORTS:** view point coordinates and view(s) displayed, examples to exercise different options like save, restore and delete.

**UNIT-V: COMPUTER AIDED SOLID MODELING:** Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling ofBuilding & Building Parts.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CE1201** | |
| **Course Title: BUILDING MATERIALS AND CONCRETE TECHNOLOGY** | |
| **CO-1** | Apply principles of drawing to draw the projections of solids. |
| **CO-2** | Apply principles of drawing to draw sections of solids and sectional views. |
| **CO-3** | Apply principles of drawing to draw the development of solids |
| **CO-4** | Apply the principles of drawing to draw the intersection of right regular solids. |
| **CO-5** | Apply the principles of drawing to draw the perspective views of points, lines, plane figures and simple solids. |
| **CO-6** | Draw isometric and orthographic drawings using CAD packages. |

## SYLLABUS: ENGINEERING CHEMISTRY LAB (B19BS1207)
(Common to CE & ME)

**LIST OF EXPERIMENTS:**

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.Conductometric 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 of Acid value of oil.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1207** | |
| **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 real time 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: COMMUNICATION SKILLS LAB (B19HS1202)

(Common to CE, ECE, EEE & ME)

**UNIT-I:** JAM, Common Errors Neutralizing accent

**UNIT-II:** Telephonic Etiquette,Role Plays, Poster Presentations

**UNIT-III:** Presentation SkillsPublic Speaking Data Interpretation

**UNIT-IV:** Group Discussion Do’s and Don’ts

**UNIT-V:** Curriculum Vitae Covering Letter Interview Skills Mock Interviews, FAQ's.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS1202** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

## SYLLABUS: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (B19CS1204)

(Common to CE, EEE & ME)

1. Exercise 1:
   1. Write a C program to print a block F using hash (#), where the F has a height of six charactersand width of five and four characters.
   2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches andwidth of 5 inches.
   3. Write a C program to display multiple variables.
2. Exercise 2:
   1. Write a C program to calculate the distance between the two points.
   2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and pis even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sumof p and q print "Correct values", otherwise print "Wrong values".
3. Exercise 3:
   1. Write a C program to convert a string to a long integer.
   2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
   3. Write a C program to calculate the factorial of a given number.
4. Exercise 4:
   1. Write a program in C to display the n terms of even natural number and their sum.
   2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
   3. Write a C program to check whether a given number is an Armstrong number or not.
5. Exercise 5:
   1. Write a program in C to print all unique elements in an array.
   2. Write a program in C to separate odd and even integers in separate arrays.
   3. Write a program in C to sort elements of array in ascending order.
6. Exercise 6:
   1. Write a program in C for multiplication of two square Matrices.
   2. Write a program in C to find transpose of a given matrix.
7. Exercise 7:
   1. Write a program in C to search an element in a row wise and column wise sorted matrix.
   2. Write a program in C to print individual characters of string in reverse order.
8. Exercise 8:
   1. Write a program in C to compare two strings without using string library functions.

2. Write a program in C to copy one string to another string.

9. Exercise 9:
    1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
    2. Write a program in C to demonstrate how to handle the pointers in the program.
10. Exercise 10:
    1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
    2. Write a program in C to add two numbers using pointers
11. Exercise 11:
    1. Write a program in C to add numbers using call by reference.
    2. Write a program in C to find the largest element using Dynamic Memory Allocation
12. Exercise 12:
    1. Write a program in C to swap elements using call by reference.
    2. Write a program in C to count the number of vowels and consonants in a string using a pointer.
13. Exercise 13:
    1. Write a program in C to show how a function returning pointer.
    2. Write a C program to find sum of n elements entered by user. To perform this program, allocatememory dynamically using malloc( ) function
14. Exercise 14:
    1. 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 program.
    2. Write a program in C to convert decimal number to binary number using the function.
15. Exercise 15:
    1. Write a program in C to check whether a number is a prime number or not using the function.
    2. Write a program in C to get the largest element of an array using the function.
16. Exercise 16:
    1. Write a program in C to append multiple lines at the end of a text file.
    2. Write a program in C to copy a file in another name.
    3. Write a program in C to remove a file from the disk.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19CS1204** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able design and development of C problem solving skills . |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program. |

# SYLLABUS: WORK SHOP PRACTICE LAB (B19ME1205)
(Civil Engineering)

## LIST OF EXPERIMENTS:

**CARPENTRY**
1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

**FITTING**
1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

**TIN SMITHY**
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 THREE exercises to be done from each trade.**

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME1205** | |
| **Course Title: WORK SHOP PRACTICE LAB** | |
| **CO-1** | Apply wood working skills in real world applications. |
| **CO-2** | Build different parts with metal sheets in real world applications. |
| **CO-3** | Apply fitting operations in various applications. |
| **CO-4** | Apply different types of basic electric circuit connections. |

# COMPUTER SCIENCE AND ENGINEERING

## COMPUTER SCIENCE & ENGINEERING

**SYLLABUS: ENGLISH (B19HS1101)**

(Common to CE, CSE, ECE, EEE, IT&ME)

**UNIT-I**: Lesson: A Drawer full of happiness from *Infotech English*, Maruthi Publications.

Listening: Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Self-introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

Grammar: Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

Pronunciation: Vowels, consonants, plural markers and their realizations.

**UNIT-II** : Lesson-: Nehru's letter to his daughter, Indira on her birthday from *Infotech English*, Maruthi Publications.

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

Reading: Identifying sequence of ideas; recognizing verbal techniques that helpto link the ideas in a paragraph together.

Reading for Writing: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

Grammar: Articles, prepositions, conjunctions, use of synonyms and antonyms.

Pronunciation: Past tense markers, word stress-di-syllabic words.

**UNIT-III:** Lesson: Stephen Hawking-Positivity' Benchmark' from *Infotech English*, Maruthi Publications.

Listening: Listening for global comprehension and summarizing what is listened to both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting whatis discussed.

Functional English: complaining and apologizing.

Reading: Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

Reading for Writing: Letter writing- types, format and principles of letterwriting, E-mail etiquette, writing a Resume/CV and covering letter.

Vocabulary: Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, wordapplications, sequencing of words.

Grammar: Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).

Pronunciation: Word stress-poly-syllabic words.

**UNIT-IV:** Lesson: Liking a Tree, Unbowed: Wangari Maathai biography from *Infotech English*, Maruthi Publications.

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.

Grammar: Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.

Pronunciation: Contrastive Stress.

**UNIT-V**: Lesson: Stay Hungry–Stay Foolish from *Infotech English*, Maruthi Publications.

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts–with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.

3

Reading for Writing: Report writing, writing academic proposals- writing researcharticles: format

and style.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

Grammar: Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).

Pronunciation: Stress in compound words.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1101** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

## SYLLABUS: MATHEMATICS-I (B19BS1101)
### (LINEAR ALGEBRA,DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS)
### (Common to All Branches)

**UNIT-I: Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II: Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS – I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform, inverse Laplace transform and solve linear ODE |

**SYLLABUS: MATHEMATICS – II (B19BS1102)**
**(NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)**
(Common to CSE ,ECE & IT)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton-Raphson method.
Trapezoidal rule, Simpson's 1/3 rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth orderRunge-Kutta method.

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.
Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method.Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation. Solutions of Linear homogeneousand non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the D'Alembert'ssolution, one- dimensional heat equation

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1102** | |
| **Course Title: MATHEMATICS – II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numericallycertain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation |

## SYLLABUS: APPLIED CHEMISTRY (B19BS1105)
## (Common to CSE, ECE & IT)

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:** Polymerization Definition, Types of Polymerization, free radical 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: Energy Sources and Applications: Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications of radicative materials Solar Photovoltaic cell- Thermal fuels – Introduction – Classification – Calorific value – HCV and LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by OttoHoffman's by Product Process , Refining crude oil; Knocking; Chemical structure Knocking, Octane number of glassline, Cetane number of diesel oil, synthetic Petrol; LPG,CNG

**UNIT-III: Electrochemical cells and Corrosion:** Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel 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. Indian standards and WHO standards of drinking water. Design of drinking water plant.

**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 chemistryof 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: B19BS1105** | |
| **Course Title: APPLIED CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C (B19CS1101)
### (Common to CSE & IT)

**UNIT-I:** Introduction to Fundamentals of Computer Science & Visual Programming through Scratch and App Inventor, Flowchart design through Raptor

History of digital computers, types of computers, Computer Programming- Machine Language, Assembly language and high-level and low level languages, Assemblers, Compilers, and Interpreters, Types of memory.

Visual Programming through Scratch and App Inventor: Introduction to programming concepts with scratch, Scratch environment, sprites looks and motion, Angles and directions, repetition and variation, changing costumes, adding background, Input /Output, variables and operators. Working with sounds and sprite communication and creating stories, App Generation.

Flowchart design through Raptor: Algorithm development, Flowcharts, Looping, some programming features, Pseudo code, some structured programming concepts, documents.

**UNIT-II:** Introduction to 'C' language :Structure of C program, A Simple C program, identifiers, basic data types and sizes,Constants, variables, Operators, expressions, type conversions, conditional expressions,precedence and order of evaluation. Input-output statements, statements and blocks, Conditional Statements and Loops.

**UNIT-III:** Functions and arrays: Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs. Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays.

**UNIT-IV:** Pointers and Structures: pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

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, Single Linked list, typedef, bitfields.

**UNIT-V**: Files: Input and output - concept of a file, text files and binary files, streams, standard I/o,Formatted I/o, file I/o operations, error handling, C program examples.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1101** | |
| **Course Title: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C** | |
| **CO-1** | The student will be able to develop Flow charts and write algorithms. |
| **CO-2** | The student will be able to develop efficient algorithms for solving a problemusing the constructs of a programming language like conditional, iteration and recursion. |
| **CO-3** | The student will able write programs using functions and arrays |
| **CO-4** | The student will able write programs using Pointers and Structures |
| **CO-5** | The student will able write programs for Files |

## SYLLABUS: APPLIED CHEMISTRY LAB (B19BS1108)
### (Common to CSE, ECE & IT)

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

**Demo:**

1. Biodiesel from used cooking oil.
2. Construction of electrochemical cells.
3. Synthesis of semiconductors.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1108** | |
| **Course Title: APPLIED 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 real time 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 LAB (B19HS1102)
**(Common to All Branches)**

**UNIT-I:** Pronunciation

Letters and Sounds

The Sounds of English

Phonetic Transcription

**UNIT-II:** Past tense markers

Word stress-di-syllabic words

Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms

Stress in compound words

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C LAB (B19CS1104)

**(Common to CSE & IT)**

Exercise 1:

1. Visual Programming through Scratch: Sprites looks and motion, Angles and directions, repetition and variation
2. Flowchart design through Raptor: Finding maximum of 3 numbers, Interest calculators, multiplication tables, GCD of 2 numbers, prime number generation.

Exercise 2:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.
3. Write a C program to display multiple variables.
4. Write a C program to calculate the distance between the two points.
5. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.
4. Write a program in C to display the n terms of even natural number and their sum.
5. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.

Exercise 4:

1. Write a C program to check whether a given number is an Armstrong number or not.
2. Write a program in C to print all unique elements in an array.
3. Write a program in C to separate odd and even integers in separate arrays.
4. Write a program in C to sort elements of array in ascending order.

Exercise 5:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.
3. Write a program in C to search an element in a row wise and column wise sorted matrix.
4. Write a program in C to print individual characters of string in reverse order.

Exercise 6:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.
3. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
4. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 7:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.
3. Write a program in C to add numbers using call by reference.
4. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 8:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.
3. Write a program in C to show how a function returning pointer.
4. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( ) function.

Exercise 9:

1. 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
2. Write a program in C to convert decimal number to binary number using the function.
3. Write a program in C to check whether a number is a prime number or not using the function.
4. Write a program in C to get the largest element of an array using the function.

Exercise 10:

1. Write a program in C to append multiple lines at the end of a text file.

## COMPUTER SCIENCE AND ENGINEERING

**SYLLABUS : MATHEMATICS-III (B19BS1202)**

**(Multivariable Calculus and Fourier analysis)**

(Common to CE, CSE, ECE, EEE & IT)

**UNIT-I: 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.

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

**UNIT-III: Single and Multiple integrals:** Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.

Double and triple integrals, change of variables, Change of order of integration.Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation:** Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, 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: B19BS1202** | |
| **Course Title: MATHEMATICS-III** | |
| **CO-1** | Determine Fourier series and half range series of functions. |
| **CO-2** | Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals. |
| **CO-3** | Use the knowledge of Beta and Gamma functions in evaluating improper integrals. |
| **CO-4** | Evaluate double integrals, simple triple integrals & find areas and volume. |
| **CO-5** | Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential. |
| **CO-6** | Apply Green's, Stokes' and Gauss divergence theorems to solve problems. |

## SYLLABUS: APPLIED PHYSICS (B19BS1203)
## (Common to CSE, ECE & IT)

**UNIT-I: WAVE OPTICS: Interference:** Principle of super position. Interference of light, interference in thin films (reflected light) – Wedge film and Newton`s rings – Applications

**Diffraction:** Types of diffraction, Fraunhoffer diffraction at a single alit, Diffraction grating, grating spectrum. Missing order, Resolving power, Rayleigh's Criterion, Resolving power of Grating, Telescope, Microscope (qualitative treatment only)

**UNIT-II: DIELECTRICS AND MAGNETICS: Dielectrics** : Introduction to dielectrics, Electric Polarization, Dielectric polarizability, Susceptibility, Dielectric constant, Types of Polarization, Frequency dependence of Polarization, Internal field in a dielectric, Claussius and Mosotti equation, Applications of dielectrics.

**Magnetics**: Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials, Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications.

**UNIT-III: LASERS AND FIBER OPTICS: Lasers**: Introduction, Interaction fof radiation with matter, condition for light amplification, Einstein's relations. Requirements of lasers device Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

**Fiber Optics**: Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

**UNIT-IV: SEMICONDUCTORS:** Introduction, intrinsic semi conductors, density of charge carries, Fermi energy, Electrical conductivity – Extrinsic semi conductors – P-type and N-type, Density of charge carriers, dependence of Fermi energy on carrier concentration and temperature, direct and indirect band – gap semi conductors, Hall effect, Applications of Hall effect. Drift and diffusion currents, Continuity equation, applications of semi conductors.

**UNIT-V: ULTRASONICS AND NANOMATERIALS: Ultrasonics:** Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating, applications of ultrasonics.

**Nanomaterials:** Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemical vapour Deposition and Sol – Gel methods, Characterization techniques for Nano materials, Carbon nanotubes (CNTS), Applications ofNano materials.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1203** | |
| **Course Title: APPLIED PHYSICS** | |
| **CO-1** | **Interpret** the behavior of light radiation in interference and diffraction Phenomena and their applications. |
| **CO-2** | **Explain** the properties of dielectric and magnetic materials suitable for engineering applications. |
| **CO-3** | **Explain** the important aspects of semiconductors and electrical conductivity in them. |
| **CO-4** | **Understand** the basics of modern technologies lasers, optical fibers and ultrasonics and their utility in various fields. |
| **CO-5** | **Demonstrate** the synthesis methods and applications of nano materials. |

## SYLLABUS: DIGITAL LOGIC DESIGN (B19CS1202)
### (Common to CSE & IT)

**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:** Multiplier. Magnitude Analysis Procedure. Design Procedure. Binary Adder-Subtractor. Decimal Adder. Binary Comparator. Decoders. Encoders. Multiplexers. HDL Models of Combinational Circuits.

**UNIT-IV: Sequential Logic design:** Sequential Circuits .Latches. Flip-Flops. RS- Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D Flip Flops, Truth and Excitation Tables, Conversion of 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 andCorrection. Read-Only Memory. Programmable Logic Array. Programmable Array Logic.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1202** | |
| **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: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING (B19CS1203)

(Common to CSE & IT)

**UNIT-I: Algorithms- Performance analysis, Searching and Sorting**

Algorithms, Performance analysis- time complexity and space complexity, AsymptoticNotation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Searching–Linear and binary search methods.

Sorting –Bubble sort, Insertion sort, Selection Sort, Quick sort, Merge sort, comparison ofsorting methods.

Representation of single, two dimensional arrays, Sparse matrices and their representation.

**UNIT-II: Stacks and Queues**

Stack and Queue ADTs, array and linked list representations, applications- infix to postfix,Postfix Evaluation, recursion, Circular queue-insertion and deletion, Dequeue ADT.

**UNIT-III: Introduction to Python**

Python – Numbers, Strings, Variables, operators, expressions, statements, String operations,

Math function calls, Input / Output statements, Conditional If, while and for loops, Userdefined Functions, parameters to functions, recursive functions, Turtle Graphics.

**UNIT-IV: Data Structures and Idiomatic Programming in Python**

Lists, Tuples, Dictionaries, Strings, Files and their libraries. Beautiful Idiomatic approach tosolve programming problems.

**UNIT-V: Event driven Programming**

Turtle Bar Chart, Event Driven programming. Key press events, Mouse events, timerevents.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS1203** | |
| **Course Title: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING** | |
| **CO-1** | Ability to implement various searching and sorting techniques. |
| **CO-2** | Student will be able to write programs to implement stack and queues |
| **CO-3** | Proficiency in creating based applications using the Python Programming Language. |
| **CO-4** | To be able to understand the various data structures available in Python Programming language and apply them in solving computational problems. |
| **CO-5** | To be able to draw various kinds of plots using PyLab and Event driven Programming. |

## SYLLABUS: ENGINEERING DRAWING (B19ME1201)

(Common to CSE,ECE & IT)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only), 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 Second Semester Course** | |
|---|---|
| **Course Code: B19ME1201** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

## SYLLABUS: APPLIED PHYSICS LAB (B19BS1206)

(Common to CSE, ECE & IT)

**LIST OF EXPERIMENTS:**

1. Determination of the Wavelength of light from a source – Diffraction Grating – Normal incidence.
2. Determination of radius of curvature of Plano convex lens – Newton's Rings.
3. Determination of the thickness of a thin spacer using interference – Air Wedge method.
4. Determination of Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
6. Determination of Temperature Coefficient of Resistance of a thermistor
7. Determination of resistivity of semiconductors by Four probe method.
8. Determination of dielectric Constant by charging and discharging method.
9. Resolving power of a grating.
10. Determination of the velocity of sound - Volume Resonator method.
11. Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum.
12. Verification of the laws of vibrations in stretched stings - Sonometer.
13. Determination of Magnetic susceptibility by Quinke's method.
14. Study of variation of dielectric constant with temperature.
15. Determination of the frequency of the AC supply – AC Sonometer.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1206** | |
| **Course Title: APPLIED 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: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING LAB (B19CS1205)

(Common to CSE & IT)

### LIST OF EXPERIMENTS

1. C program for sorting a list using Bubble sort and then apply binary search.
2. C program to implement the operations on stacks.
3. C program to implement the operations on circular queues.
4. C program for evaluating a given postfix expression using stack.
5. C program for converting a given infix expression to postfix form using stack.
6. C program for implementing the mazing problem.
7. C program for the representation of polynomials using linked list and for the addition of two such polynomials.
8. C program for quick sort .
9. C program for Merge sort.
10. Design a Python script to convert a Binary number to Decimal number and verify if it is a Perfect number.
11. Design a Python script to determine if a given string is a Palindrome using recursion
12. Design a Python script to sort numbers specified in a text file using lists.
13. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.
14. Design a Python Script to determine the Square Root of a given number without using inbuilt functions in Python.
15. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.( 0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <= 59)
16. Design a Python Script to find the value of (Sine, Cosine, Log, PI, e ) of a given number using infinite series of the function.
17. Design a Python Script to convert a given number to words
18. Design a Python Script to convert a given number to roman number.
19. Design a Python Script to generate the frequency count of words in a text file.
20. Design a Python Script to print a spiral pattern for a 2 dimensional matrix.
21. Design a Python Script to implement Gaussian Elimination method.
22. Design a Python script to generate statistical reports(Minimum, Maximum, Count, Average, Sum etc) on public datasets.
23. Design a Python script using the Turtle graphics library to construct a turtle bar chart

representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS1205** | |
| **Course Title: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING LAB** | |
| **CO-1** | Student will be able to write programs to implement stack and queues |
| **CO-2** | Ability to implement various searching and sorting techniques. |
| **CO-3** | To develop proficiency in creating based applications using the Python Programming Language. |
| **CO-4** | To be able to understand the various data structures available in Python programming language and apply them in solving computational problems. |
| **CO-5** | To be able to do testing and debugging of code written in Python. |
| **CO-6** | To be able to draw various kinds of plots using PyLab. |
| **CO-7** | To be able to do text filtering with regular expressions in Python |

## SYLLABUS: COMMUNICATION SKILLS LAB (B19HS1203)
**(Common to CSE& IT)**

**UNIT-I:** JAM, Common Errors, Neutralizing accent

**UNIT II:** Telephonic Etiquette, Role Plays, Poster Presentations

**UNIT-III:** Presentation Skills,Public Speaking, Data Interpretation

**UNIT-IV:** Group Discussion, Do's and Don'ts

UNIT V: Curriculum VitaeCovering Letter Interview Skills, Mock Interviews, FAQ's

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1203** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

## SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19CS1206)

(Computer Science & Engineering)

**Apply Design thinking on the following Streams to**

**Project Stream 1**:

Electronics, Robotics, IOT and Sensors

**Project Stream 2**:

Computer Science and IT Applications

**Project Stream 3**:

Mechanical and Electrical tools

**Project Stream4**:

Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources,Agriculture, Environmental science and other fields of engineering.

## COMPUTER SCIENCE AND ENGINEERING
## SYLLABUS: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (B19CS2101)

**UNIT-I : Mathematical Logic:** Propositional Calculus: Statements and Notations, Connectives, Well-formed Formulae, 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 for Predicate Calculus..

**UNIT-II : Combinatorics**: Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations,Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Theorems, Binomial and Multinomial Coefficients, Principles of Inclusion–Exclusion.

**UNIT-III: Relations and Algebraic Structures: Relations:** Definition of Relation, Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Transitive Closure, Equivalence, Compatibility andPartial Ordering Relations, Hasse Diagrams.

**Algebraic Structures:** Algebraic Systems, Semi Groups, Monoids, Groups, and Abelian Group, Homomorphism of Semi Groups, Monoids and Groups.

**UNIT-IV: Recurrence Relations:** Generating Functions, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relationsby Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

**UNIT-V: Graph Theory:** Basic Concepts of Graphs, Sub graphs, Isomorphism of Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite graphs, Planar Graphs, Euler's Formula.

**Trees**: Definition of Tree, properties of Trees, Different tree structures, Binary trees,Spanning trees, Minimal Spanning Trees, Kruskal's and Prim's Algorithms.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19CS2101** | |
| **Course Title: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE** | |
| **CO-1** | Write and verify the arguments for their validity using propositional and predicate logic. |
| **CO-2** | Observe different counting methods and apply in their fields of study. |
| **CO-3** | Identify various types of relations and utilize their properties. |
| **CO-4** | Understand different Algebraic structures and their properties. |
| **CO-5** | Formulate and solve the recurrence relations. |
| **CO-6** | Utilize the concepts in graphs and trees to understand different data structures. |

## SYLLABUS: SOFTWARE ENGINEERING (B19CS2102)

UNIT-I: Software and Software Engineering:

The nature of Software, 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

Agile Development:

Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, A Tool Set for the Agile Process

UNIT-II: Software Requirement analysis and Specification:

Software Requirements, Problem analysis, Requirements specification, Functional specification with use cases, validation.

Software Architecture:

Role of Software Architecture, Architecture views, Component and Constructor views, Architecture styles for C&C Views.

UNIT-III: Function Oriented Design:

Design Principles, Module level concepts, Design notation and specifications, structuredesign methodology

Object Oriented Design:

Object Oriented Analysis and design, Object Oriented Concepts, Design Concepts, UML, ADesign methodology

User Interface Design:

Interface analysis, Interface design steps.

UNIT-IV: Testing Conventional applications: Software testing fundamentals, Internal and external views of testing, White Box testing,Basis path testing, Control structure testing, Black-Box testing, Model based testing

Testing Object Oriented Applications: Testing OOA and OOD models, Object Oriented Testing strategies, Object Oriented Testing Methods, Testing methods applicable at class level.

UNIT-V: Planning a Software Project: Process Planning, Effort Estimation, Project Scheduling and Staffing Software Configuration Management Plan, Quality Plan, Risk Management, Project Monitoring Plan

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2102** | |
| **Course Title: SOFTWARE ENGINEERING** | |
| **CO-1** | Understand the different software process models and their significance. |
| **CO-2** | Distinguish various requirements gathering procedures and architectural views. |
| **CO-3** | Analyze various aspects of the system such as functionality, object and user interface. |
| **CO-4** | Identify the testing strategies for conventional and object oriented applications. |
| **CO-5** | Plan and implement various software project management activities. |

## SYLLABUS: OBJECT ORIENTED PROGRAMMING (B19CS2103)

**UNIT-I: Basics of Object Oriented Programming:** Object Oriented Paradigm, Principles of OOP, benefits of OOP, data types, declarations, expressions and operator precedence, functions, scope of variables.

**C++ Basics:**

Classes and objects, Constructors & Destructors, constructor with dynamic allocation, Friend function, Friend Classes, Inline Function, Default Arguments, operator Overloading through Unary, Binary, Assignment and Stream operators &type conversions, Nested Classes, Local Classes, Static class members, Array of objects.

**UNIT-II: Inheritance and Manipulating Strings:** Derived classes, making private members inheritable, Inheritance and its Types, Virtual base Class, Creating String Objects, Manipulating String Objects, Relational Operations,and Accessing String Characteristics.

**Polymorphism:**

Pointers, pointers to objects, this pointer, pointers to derived classes, references, abstract classes, virtual and pure virtual functions, Dynamic polymorphism, Virtual destructor,Virtual Base Class, Dynamic Allocation Operators.

**UNIT-III: Templates, Exception handling:** Generic Functions, Generic Classes, Member function templates, using Default arguments with Template Classes, Exception Handling Fundamentals, catching class types, using multiple catch statements, Handling Derived class Exceptions.

**Streams and Files in C++:**

Stream Classes, Formatted and Unformatted I/O operations, managing output with manipulators, working with files, C-Based I/O Functions.

**UNIT-IV: JAVA Basics:** Introduction, Classes and Objects, Method Overloading, Method Overriding, Final Keyword, Inheritance, Abstract Classes and Interfaces, Arrays (ID & 2D), Strings (String Class and String Buffer Class) and Vectors

**Exception Handling and Packages:**

Exception types, usage of try, catch, throw, throws and finally keywords, built in exceptionsand creating our own exception, Packages: Defining, creating, accessing a package, access protection of packages, importing packages and static import.

**UNIT-V: Multi threading:** Introduction on Thread, Life cycle of a Thread, Thread Priorities, Synchronization,Implementing the Runnable interface.

**Managing I/O files in Java:**

Stream Classes, Byte and Character Oriented Classes, Using File Classes, Handlingprimitive data types

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2103** | |
| **Course Title: OBJECT ORIENTED PROGRAMMING** | |
| **CO-1** | Illustrate Object Oriented Concepts (OOP) through C++ |
| **CO-2** | Apply Inheritance and polymorphism in C++ |
| **CO-3** | Apply C++ Programming on File Manipulation, Generic modules and Exception handling |
| **CO-4** | Illustrate JAVA Programming basics and features |
| **CO-5** | Implement JAVA Programming on File and thread management. |

## SYLLABUS: ADVANCED DATA STRUCTURES (B19CS2104)

**UNIT-I: Linked Lists:**

Definition and storage organization of Linked List, Singly Linked List and its Operations(Insert first, Insert end, Insert at a given position, Traversing, Reverse, Counting number of nodes, Searching for a particular element, Sort the elements in the list).

Doubly Linked Lists and its Operations, Circular Linked Lists and its Operations, Representing polynomials using linked lists, Polynomial Addition and PolynomialMultiplication.

**UNIT-II: Trees and Priority Queues:**

Definition of General Tree, Tree Terminology, Binary Tree Representation and Types of Binary Trees, Threaded Binary Tree, Binary Search Tree and its Operations(Insert, Delete, Search, Tree Traversals, Finding Height of a tree, Count number of nodes in the given tree).Priority Queue definition, Types of Priority Queue, Binary Heap, Implementation of Min

Priority Queue using Binary heap, Operations (Insertion into Min Heap, Deletion from Min Heap, Search for an element), Heap Sort.

**UNIT-III: Advanced Trees:**

Balanced Search Trees, AVL tree properties, implementation and its operations, Construction of red Black Trees, Splay Trees and 2-3 Trees. m-ary Search Trees, B-Tree Construction and its Operations, B+ Tree Construction and its Operations. Data Structures for Strings: Tries and Compressed Tries, Suffix Trees and Suffix Arrays.

**UNIT-IV: Graphs**

Graph ADT, Definition and Graph Terminology, Representation of Graphs, Elementary Graph Operations ( Create, Insertion, Deletion), Graph Traversals- Depth First Search(DFS) and Breadth First Search(BFS).

Spanning Tree, Minimum cost Spanning Tree- Prim's Algorithm, Kruskal's Algorithm. Topological Sort, Applications of DFS for finding-Bi Connectivity, Euler Circuits and Strong Components.

**UNIT-V: Hashing, External Sorting and Pattern Matching:**

Hashing, Hash Table Structure, Hash Function, Collision, Collision Resolution Techniques, Separate Chaining, Open Addressing or Closed Hashing, Rehashing, Extendible hashing.

Differences between Internal Sorting and External Sorting, External Sorting Algorithms: Simple Algorithm, Multi way Merge.

Pattern Matching, Naive Pattern Matching algorithm, Knuth-Morris-Pratt(KMP) algorithm, Rabin Karp algorithm.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2104** | |
| **Course Title: ADVANCED DATA STRUCTURES** | |
| **CO-1** | Identify an appropriate data Structure to solve the given problem. |
| **CO-2** | Apply the knowledge of trees to construct various types of tree structures for the given data. |
| **CO-3** | Apply Graph algorithms to solve network problems. |
| **CO-4** | Identify an appropriate collision resolution technique to handle collisions. |
| **CO-5** | Apply pattern matching algorithms to find the patterns in the given data. |

## SYLLABUS: COMPUTER ORGANIZATION (B19CS2105)

**UNIT-I: Digital Computers and Arithmetic:** Historical perspective and von Neumann computers, Memory and Peripheral devices.

Fixed and floating-point representation of numbers, Addition and Subtraction, Multiplication and Division algorithms, Floating-point arithmetic operations.

**UNIT-II: Instruction Set Architectures:**

Stack Organization, Instruction Formats, Addressing Modes.

Computer Instructions, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Instruction Cycle, Input-Output and Interrupt, Complete Computer Description.

**UNIT-III: Basic Computer Organization and Design:**

General Register Organization and Bus system, Timing and Control, Micro Operations andALU,

Design of Basic computer.

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

**UNIT-IV: Memory and I/O Organization:**

Memory Accessing techniques, Memory Hierarchy, Cache Memory, and Virtual memory. I/O interface and data transfer, Modes of transfer, Priority interrupt, Direct memory accessand IOP.

**UNIT-V: Parallel Architectures:**

Parallel Processing, Pipelining, Arithmetic and Instruction Pipelines, RISC Pipeline, Vector Processing, Array Processors.

Multiprocessors and Interconnection Networks, Symmetric multiprocessors, Cache coherence**.**

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19CS2105** | |
| **Course Title: COMPUTER ORGANIZATION** | |
| **CO-1** | Identify basic building blocks of a computer. |
| **CO-2** | Design of computer functional blocks. |
| **CO-3** | Identify the parameters that enhance system performance. |

## SYLLABUS: OBJECT ORIENTED PROGRAMMING LAB (B19CS2106)

**List of C++ Programs**

1. Program that implements Stack operations using classes and objects.
2. Program for performing complex number addition using friend functions.
3. Program to implement Function Overloading.
4. Program to implement Constructor Overloading.
5. Program that illustrates how objects are destroyed
6. Program to overload increment and decrement operators using Unary Operator.
7. Program for complex number addition and subtraction using binary operator overloading(use member function and friend function).
8. Program to overload stream operators
9. Program for writing and reading a class object to a file
10. Program to perform string operations by overloading operators.
11. Program to implement get(), getline() member functions of Stream Input.
12. Program for copying one file to another file using streams
13. Program to implement single inheritance.
14 Program on hierarchical inheritance showing public, private and protected inheritances.
15. Program for computation of students results using hybrid inheritance.
16. Program implementing bubble-sort using function templates.
17. Program to find scalar product of two vectors using class templates.
18. Program to implement member function template.
19. Write a C++ program that illustrates how runtime polymorphism run is achieved using virtual functions.
20. Program to implement Stream Manipulators

**List of JAVA Programs**

1. Program to implement Method overriding.
2. Program to implement Multiple Inheritance using Interfaces.
3. Program on hierarchical inheritance..
4. Program for Multiplication of TWO Matrices.
5. Program to convert character array to string.

6. Program to perform various vector operation
7. Program to implement methods in
   a) String Comparison
   b) Searching Strings
   c) Modifying a Strings
8. Program on packages.
9. Program to import from various classes and methods from multiple packages
10. Program for handling
    a)ArrayIndexOutOfBoundsException.
    b)Arithmetic Exception
    c)ClassNotFound Exception
    d)NullPointer Exception
    e)IOException
11. Program for Custom Exception Creation.
12. Program on multithreading showing how cpu time is shared among all threads.
13. Program to implement Runnable Interface.
14. Program to implement yield (), sleep(), stop() methods using Threads.
15. Program to set Priorities for various Threads.
16. Program to copy characters from one file to another file.
17. Program to copy bytes from one file to another file.
18. Program for WRAPPER Classes

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2106** | |
| **Course Title : OBJECT ORIENTED PROGRAMMING LAB** | |
| **CO-1** | Implement C++ programs for applying C++ object oriented features, File and exception handling. (K3) |
| **CO-2** | Develop Java applications using basic features, multi-threading and file I/O. |

## SYLLABUS: ADVANCED DATA STRUCTURES LAB (B19CS2107)

### LIST OF EXPERIMENTS:

1. Implementation of singly linked list
2. Implementation of doubly linked list
3. Program to reverse the nodes in a circular linked list
4. Program to perform operations on two polynomials using linked list
5. Implement traversal techniques in binary tree
6. Beginning with an empty binary search tree, construct binary search tree by inserting the values in the order given. After constructing a binary tree -
   - Insert new node
   - Find number of nodes in longest path
   - Minimum data value found in the tree
   - Change a tree so that the roles of the left and right pointers are wrapped at every node.
   - Search a value
7. Write a program to perform the following operations
   - Insertion into an AVL-tree
   - Deletion from an AVL-tree
8. Program to implement priority queue using Heap
   - Inserting new element
   - Deletion of minimum element
9. Write a program to implement DFS and BFS traversals.
10. Write a program to find minimum spanning tree using Prim's Algorithm
11. Write a program to find minimum spanning tree using Kruskal's Algorithm
12. Write a program to implement topological sort
13. Write a program for creating an Open Addressing Hash Table with linear probing and quadratic probing.
14. Write a program to implement Naive Pattern Matching algorithm
15. Write a program to identify the desired patterns with Knuth-Morris-Pratt (KMP) algorithm
16. Write a program to implement Rabin Karp pattern matching algorithm.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19CS2107** | |
| **Course Title: ADVANCED DATA STRUCTURES LAB** | |
| **CO-1** | Obtain linked list and Trees knowledge in practical applications using different languages. |
| **CO-2** | Implement graph algorithms to solve various real time applications |
| **CO-3** | Implement different Hash Tables and Pattern Matching Algorithms. |

## SYLLABUS: PROFESSIONAL ETHICS AND HUMAN VALUES (B19MC2101)

**UNIT-I: Human Values:**

Morals, Values and Ethics-Integrity-Work Ethic-Service learning Civic Virtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence Character Spirituality.

**UNIT-II: Engineering Ethics:**

Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmas Moral autonomy-Kohlberg's theory- Gilligan's theory-Consensus and controversy Models of professional roles-Theories about right action-Self-interest -Customs and religion Usesof Ethical theories Valuing time Cooperation Commitment.

**UNIT-III: Engineering as Social Experimentation:**

Engineering As Social Experimentation- Framing the problem- Determining the facts codes of Ethics-Clarifying Concepts- Application issues Common Ground -General Principles- Utilitarian thinking respect for persons.

**UNIT-IV: Engineers Responsibility for Safety and Risk:**

Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety- Intellectual Property rights (IPR).

**UNIT-V: Global Issues**: Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers-Computer codes of Ethics- Weapons
Development -Ethics and Research Analyzing Ethical Problems in research.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19MC2101** | |
| **Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES** | |
| **CO-1** | Identify and analyze an ethical issue in the subject matter under investigation or ina relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work. |
| **CO-2** | Identify the multiple ethical interests at stake in a real-world situation or practice and Articulate what makes a particular course of action ethically defensible. |
| **CO-3** | Assess their own ethical values and the social context of problems. |
| **CO-4** | Identify ethical concerns in research and intellectual contexts, including academicintegrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects. |
| **CO-5** | Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research. |

## COMPUTER SCIENCE AND ENGINEERING

## SYLLABUS: PROBABILITY AND STATISTICS (B19 BS 2202)

**UNIT-I: Descriptive statistics and methods for data science:**

Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variables: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance), Skewness, Kurtosis

Correlation: Definition, Karl Pearson's Coefficient of Correlation, Limits for correlation coefficient, Rank Correlation, Spearman's formula for rank correlation coefficient (without proofs).

Regression Analysis: Regression Lines, Regression Coefficients and their properties (without proofs).

Curve fitting: Method of least Squares, fitting of a Straight line, Fitting of a Parabola.

**UNIT-II: Random Variables and Probability functions:**

Review of 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. Introduction to Joint random variable and its Probability functions.

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 Functionand Probability generating Function of a Random Variable.

**UNIT-III: Discrete and Continuous Distributions:**

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, Varianceand Memory less property of Exponential distribution.

**UNIT-IV: Sampling theory and Testing of Hypothesis:**

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 Degrees of freedom.

Large Sample Theory: Test of significance of single sample proportion, Test ofsignificance for difference of proportions.

Small Sample Theory: 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.

**UNIT-V: Queuing Theory:**

Queue description, Birth and Death Process, Distribution of Inter-arrival times, Distribution of service times, Kendall's representation of a queuing model, Operating characteristics of a queuing 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: B19 BS 2202** | |
| **Course Title: PROBABILITY AND STATISTICS** | |
| **CO-1** | Understand the concepts of data science and fit a best suitable curve for the given data |
| **CO-2** | Identify the random variable as discrete/continuous and analyse it. |
| **CO-3** | Predict the discrete distribution suitable for the given data from its moments. |
| **CO-4** | Predict the continuous distribution suitable for the given data from its moments |
| **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: ADVANCED JAVA PROGRAMMING (B19CS2201)

**UNIT-I: Applet Programming and Basic AWT Components:** Introduction to Applet, Applet Life Cycle, Passing parameters to Applet.
AWT: Basic AWT user interface controls: (Button, Checkbox, Checkbox Group, Scrollbars, Text Field, Text Area, Radio button and List box).

**UNIT-II: Java Swings:** Introduction to JSwings, Differences between AWT & Swings, Components and Containers, Exploring Swing (JFrame, JButtons, JTable, JPasswordField, JTabbedpane,JScrollpane, JTrees).
**Event-handling and Layout Managers:**
Handling events with classes and handling events by implementing interfaces, Organizing Windows with Layout Managers (Flow Layout, Border Layout, Card Layout, Grid Layout, Grid Bag Layout).

**UNIT-III: SERVLETS:** Introduction to Servlet, Servlet Life Cycle, Servlet Basics, Tomcat Web Server, Configuring Apache Tomcat, The Servlet API, The javax.servlet Package, Reading Servlet Parameters, The javax.servlet.http Package, Handling Client Request and Response, Handling Cookies, Session Tracking.

**UNIT-IV: JSP:** Introduction to JSP, JSP Elements(JSP Declaration, JSP Scripting, JSP Expression, JSP Comments), JSP Directives, implicit Objects, JSP Program for Database Access.
**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.

**UNIT-V: Network Programming:** The Networking Classes and Interfaces, InetAddress, TCP/IP Client Sockets, URLConnection, Http URLConnection, TCP/IP Server Sockets, Datagram, Datagram Socket, Datagram Packet, Remote method invocation and MVC architecture.

| **Course Outcomes for Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS2201** | |
| **Course Title: ADVANCED JAVA PROGRAMMING** | |
| **CO-1** | Design and develop window based applications with AWT/SWING components. |
| **CO-2** | Develop server side programs in the form of servlets. |
| **CO-3** | Design and develop web based applications with database access using JSP and JDBC. |
| **CO-4** | Develop client/server applications and TCP/IP socket programming. |

## SYLLABUS: OPERATING SYSTEMS (B19CS2202)

**UNIT-I:** Evolution of OS, Overview of Operating Systems, Types of Operating Systems, Operating System Structures- Kernel, Shell,

General Structure of MSDOS, Windows 2000, Linux., Operating System Services, System Calls, Virtual Machines, Introduction to Distributed Systems,

**UNIT-II:** Processes: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication

Threads: Overview, Multicore Programming, Multithreading Models

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling

Process Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization, Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors

**UNIT-III:** Dead lock system model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Deadlock Recover

**UNIT-IV:** Logical versus Physical Address map, Swapping, contiguous memory allocation, segmentation, paging, structure of the page table, Virtual Memory, Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files.

**UNIT-V:** I/O Hardware, Application I/O Interface, File Concept, Access Methods, File-System Structure & Implementation, Disk Structure & Implementation, Disk Scheduling & Management

Security & Protection: Principles of Protection, Domain of Protection, Access Matrix, The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool

Case Study of UNIX, MS-DOS and Windows

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2202** | |
| **Course Title: OPERATING SYSTEMS** | |
| **CO-1** | Outline the OS evaluation, its structure, concepts and services. |
| **CO-2** | Express process lifecycle, process scheduling, process synchronization and IPC. |
| **CO-3** | Explain the deadlock model characterization, its detection, prevention and recovery. |
| **CO-4** | Explain the memory hierarchy, allocation & de-allocation mechanism, virtual memory and segmentation concepts. |
| **CO-5** | Learn about the file system design, I/O principles and disk management implementation. |

## SYLLABUS: DATA BASE MANAGEMENT SYSTEMS (B19CS2203)

**UNIT-I: Introduction:** What is DBMS, Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators, History of Database Systems.

**ER Model:** Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, Entity-Relationship Design Issues, Extended E-R Features.

**UNIT-II: Relational Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, RelationalQuery Languages, Relational Operations.

**Relational Query Languages:** The Relational Algebra, Tuple Relational Calculus, The Domain Relational Calculus

**UNIT-III: SQL:** Overview of the SQL, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database, Join Expressions, Views, Integrity Constraints,

SQL Data Types and Schemas, Authorization, JDBC, ODBC, Embedded SQL, Functions and Procedures, Triggers.

**UNIT-IV: Storage strategies:** Basics of Indexing and B+ trees, RAID

**Query processing and optimization:** Measures of Query Cost, Transformation of Relational Expressions.

**Normalization:** Introduction, Functional dependencies, Decomposition, First, Second, and third normal forms, Boyce/Codd normal form. Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form.

**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 Timestamp Ordering Protocol.

**Crash Recovery:** Shadow Paging, Log-based Recovery, The Log, The Write-Ahead Log Protocol, ARIES.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS2203** | |
| **Course Title: DATA BASE MANAGEMENT SYSTEMS** | |
| **CO-1** | Describe the fundamental concepts of DBMS and RDBMS. |
| **CO-2** | Design ER Models for simple application scenario. |
| **CO-3** | Apply Relational Query Languages on Relations. |
| **CO-4** | Apply SQL commands for defining, constructing and manipulating databases. |
| **CO-5** | Apply normalization techniques to improve the database design. |
| **CO-6** | Explain concurrency control and crash recovery techniques. |

## SYLLABUS: DESIGN AND ANALYSIS OF ALGORITHMS (B19CS2204)

**UNIT-I: INTRODUCTION:**

Getting Started: Insertion sort, Analyzing algorithms, Designing algorithms, Growth of Functions: Asymptotic Notation, Standard notations and common functions, Master methodfor solving recurrences

DIVIDE AND CONQUER:

General method, Finding maximum and minimum, Merge sort, Quick sort, Performance Measurement, Selection Problem, A Worst-Case Optimal Algorithm, Strassen's matrixmultiplication, Convex hull Problem- Quick Hull Algorithm

**UNIT-II: Sets and Disjoint set union, Union and Find Operations**

THE GREEDY METHOD: General method, Knapsack problem, 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, Optimal binary search trees,String editing, 0/1Knapsack, The travelling salesperson problem

**UNIT-IV: BACKTRACKING**: General method, 8-Queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles

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: LC Branch and Bound, FIFO Branch-and-Bound, Travelling sales person problem : LC Branch and Bound

**UNIT-V: LOWER BOUND THEORY**: The method, Comparison trees, Ordered Searching, Sorting, Selection, Oracles andadversary arguments, Merging, Largest and Second largest

NP-HARD AND NP-COMPLETE PROBLEMS: Basic concepts, Nondeterministic Algorithms, The Classes NP-hard and NP-completeModular Arithmetic.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS2204** | |
| **Course Title: DESIGN AND ANALYSIS OF ALGORITHMS** | |
| **CO-1** | Apply mathematical analysis methods to analyse the algorithm running times using asymptotic notations |
| **CO-2** | Compare and understand how the choice of data structures impact the performance of various greedy algorithms |
| **CO-3** | Design algorithms using advanced design techniques such as dynamic programming for various computationally intensive problems |
| **CO-4** | Design algorithms using different paradigms like Divide and Conquer, Backtracking, Branch and Bound and explain the situations which call for usage ofthese paradigms |
| **CO-5** | Infer lower bounds for common problems like searching, sorting, merging, selection, Understand the concepts of P, NP classes and String matching |

## SYLLABUS: ADVANCED JAVA PROGRAMMING LAB (B19CS2205)

CYCLE-1 Programs

1. Write an applet program to Pass a parameters to Applet
2. Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes
3. Write a java program to demonstrate the key event handlers.
4. Write a java program to display the table using labels in grid layout and Flow layout.
5. Write a program to implement an application using AWT Components
6. Write a java program to implement JTree.
7. Write a java program to implement JTabbedPane
8. Write a java program to implement Jscrollpane
9. Write a Servlet Program to insert data into the database.
10. Write a Servlet Program to delete data from the database.
11. Write a Servlet Program to update data into the database.
12. Write a Servlet Program to retrive data from the database.
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 thread
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, JSP, 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 First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS2205** | |
| **Course Title: ADVANCED JAVA PROGRAMMING LAB** | |
| **CO-1** | Apply knowledge to improve exposure in applet programming and network programming. |
| **CO-2** | Design and develop desktop/window based applications with different AWT and SWING components. |
| **CO-3** | Design and develop web-based applications with database access using Servlets and JDBC. |
| **CO-4** | Design and develop web-based applications with database access using JSP and JDBC. |

## SYLLABUS: UNIX OPRATING SYSTEMS LAB (B19CS2206)

### LIST OF EXPERIMENTS

Module-1:

OS lab familiarization: Home Assignment on Unix commands, Vi editor

1. Simple C programs using command line arguments, system calls, library function calls, make utility
2. C programs using fork system call to create process and study parent, child process mechanism
3. C programs to create process chaining, spawning
4. C programs to handle errors using errno, perror() function
5. C programs to use pipe system call for inter process communication

Module II

Familiarization of Unix shell programming:

1. Simple shell programming exercises
2. Shell programming using decision making constructs
3. Shell programming using loop constructs
4. Shell programming for file and directory manipulation

Module III

1. C programs to study process scheduling: FCFS, Shortest Job First, and Round Robin
2. C programs to study page replacement: FIFO, Optimal, and LRU page replacement
3. C programs to study deadlock avoidance and detection
4. C Programs to simulate free space management

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS2206** | |
| **Course Title: UNIX OPRATING SYSTEMS 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. |

## SYLLABUS: DATA BASE MANAGEMENT SYSYTEMS LAB (B19CS2207)

### LIST OF EXPERIMENTS

Structured Query Language (SQL) used with the RDBMS including Features of two commercial RDBMS packages such as ORACLE, DB2, MS Access, MYSQL

**I. SQL**

a. Query-structure
b. DDL-create, alter, drop, rename and Truncate
c. DML-select, insert, update, delete and lock
d. DCL-grant and revoke
e. TCL- Commit, save point, rollback and set transaction.
f. Single line functions
g. Set operations- union, intersection and except;
h. Joins
i. Aggregate Operations, group-by and having
j. Nested sub-queries and views
k. Indexes, Sequence and Synonyms
l. Use of Forms and Reports

**II. PL/SQL**

a. Block structure, variables, operators, data types, control structures
b. Cursors - Implicit and Explicit
c. Exception handling- Predefined and user-defined
d. Stored procedures and functions
e. Triggers- Data manipulation triggers

**III. Some sample application development as a group project.**

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2207** | |
| **Course Title: DATA BASE MANAGEMENT SYSYTEMS LAB** | |
| **CO-1** | Write SQL commands for defining, constructing and manipulating databases. |
| **CO-2** | Write PL/SQL programs. |
| **CO-3** | Develop application for the given problem. |

## SYLLABUS: SOCIALLY RELEVANT PROJECT (B19CS2208)

### LIST OF EXPERIMENTS

The student can choose any one of the given below / any other socially relevant problem and work on it to produce a project document.

1. Water Conservation Related Works
2. Swatch Bharath (Internal External)
3. Helping police
4. Traffic monitoring
5. Teaching Rural Kids (Sarva siksha Abhiyan)
6. Street light monitoring
7. Electricity Conservation
8. Solar panel utilization
9. E- policing & cyber solution
10. Pollution
11. Any social related

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS2208** | |
| **Course Title: SOCIALLY RELEVANT PROJECT** | |
| **CO-1** | Use scientific reasoning to gather, evaluate, and interpret ideas |
| **CO-2** | Analyze and design solutions to solve the ideas |
| **CO-3** | Use one or more creative tools to complete the projects |

# ELECTRONICS AND COMMUNICATIONS ENGINEERING

## ELECTRONICS AND COMMUNICATION ENGINEERING

## SYLLABUS: MATHEMATICS-I (B19BS1101)

**(LINEAR ALGEBRA,DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS)**

(Common to All Branches)

**UNIT-I Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II : Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS-I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve linear ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits. |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform and inverse Laplace transform and solve linear ODE. |

# SYLLABUS: MATHEMATICS – II (B19BS1102)
## (NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)
## (Common to CSE, ECE & IT)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton-Raphson method.

Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth order Runge-Kutta method.

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.
Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method.Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation.Solutions of Linear homogeneous and non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the D'Alembert'ssolution, one- dimensional heat equation

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1102** | |
| **Course Title: MATHEMATICS – II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numericallycertain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation |

**SYLLABUS: APPLIED CHEMISTRY (B19BS1105)**
(Common to CSE ,ECE & IT)

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:** Polymerization Definition, Types of Polymerization, free radical 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: Energy Sources and Applications: Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications of radicative materials Solar Photovoltaic cell- Thermal fuels – Introduction – Classification – Calorific value – HCV and LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by OttoHoffman's by Product Process , Refining crude oil; Knocking; Chemical structure Knocking, Octane number of glassline, Cetane number of diesel oil, synthetic Petrol; LPG,CNG

**UNIT-III: Electrochemical cells and Corrosion:** Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel 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. Indian standards and WHO standards of drinking water. Design of drinking water plant.

**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 chemistryof 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: B19BS1105** | |
| **Course Title: APPLIED CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: PROGRAMMING FOR PROBLEM SOLVING USING C (B19CS1102)
### (Electronics &Communication Engineering)

**UNIT-I: Introduction to Computers:** Computer Systems, Computing Environments, Computer languages, Creating and running Programs, Computer Numbering System, Storing Integers,Storing Real Numbers

**Introduction to the C Language:** Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

**Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

**UNIT-II: Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection, Multiway Selection, More Standard Functions

**Repetition:** Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

**UNIT-III: Arrays:** Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

**Strings:** String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

**Enumerated, Structure, and Union:** The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application

**UNIT-IV: Pointers:** Introduction, Pointers to pointers, Compatibility, L value and R value

**Pointer Applications:** Arrays, and Pointers, Pointer Arithmetic and Arrays, MemoryAllocation Function, Array of Pointers, Programming Application, **Processor Commands**: Processor Commands

**UNIT-V: Functions:** Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointersto Functions, Recursion

**Text Input / Output:** Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

**Binary Input / Output:** Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1102** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C** | |
| **CO-1** | The student will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program |
| **CO-2** | The student will learn to use different operators, data types and loops for developing C Programs. |
| **CO-3** | The student will able to write programs using Arrays and Strings |
| **CO-4** | To design and implement programs to analyze the different pointer applications |
| **CO-5** | To decompose a problem into functions and to develop modular reusable code |

## SYLLABUS: BASIC ELECTRONICS (B19EC1101)
**(Electronics &Communications Engineering)**

**UNIT-I: Semiconductor Materials and Properties :** Classification of Materials, Intrinsic and Extrinsic semiconductors, Conduction in semiconductors, Charge mobility, Charge densities, Diffusion current density, Drift current
density, Hall effect.

**UNIT-II: Passive Components and Basic Meters:** Types of passive components, Types of resistors, Resistor color code, Capacitors, Concept of charging and discharging, Types of capacitances, Inductors, Mutual inductance, Inductance of two coils, KCL, KVL, Voltmeter, Ammeter, Multimeter, Basics of CRO.

**UNIT-III: Fundamentals of Diodes and Special diodes:** Elementary concepts, V-I characteristics and applications of PN junction diode, Varactor diode, Zener diode, LED, Photo diode, Rectifiers: Half Wave and Full Wave with andwithout Capacitor filters.

**UNIT-IV: Fundamentals of Transistors and Integrated Circuits (IC):** Transistor construction, Basic Operation, Input and Output characteristics, Transistor in three configurations and their comparison, Introduction to Integrated Circuits, Classificationof ICs and fabrication of Monolithic ICs.

**UNIT-V: Introduction to Number Systems and Boolean algebra.** Number Systems: Binary, Decimal, Octal, Hexadecimal, Logic gates: AND, OR, NOT, XOR, NAND and NOR, Flip Flops - RS Flip Flop, JK Flip Flop, T Flip Flop, D Flip Flop and Latches.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19EC1101** | |
| **Course Title: BASIC ELECTRONICS** | |
| **CO-1** | Understand the basic concepts of charge carriers in semi conductors, drift and diffusion current densities. |
| **CO-2** | Identify various passive components and understand the concept of KVL and KCL. |
| **CO-3** | Understand the structure and operation of various diodes, rectifier circuits. |
| **CO-4** | Understand the characteristics of BJT in CE, CB,CC configurations and IC fabrication. |
| **CO-5** | Understand the concept of number systems, logic gates and flip flops. |

## SYLLABUS: APPLIED CHEMISTRY LAB (B19BS1108)
**(Common to CSE, ECE & IT)**

1. Introduction of Chemistry Laboratory.
2. Estimation of HCL using standard Sodium Hydroxide.
3. Determination of total hardness of water by EDTA method.
4. Estimation of Ferrous Iron by KMnO4.
5. Estimation of oxalic acid by KMnO4.
6. Estimation of Mohr's salt by K2Cr2O7.
7. Estimation of Dissolved oxygen by Winkler's method.
8. Determination of pH by pH meter and universal indicator method.
9. Conductometric titration of strong acid Vs strong base.
10. Conductometric titration of strong acid Vs weak base.
11. Potentionmetric titration of strong acid Vs strong base.
12. Potentionmetric titration of strong acid Vs weak base.
13. Preparation of Phenol formaldehyde resion.
14. Determination of saponification value of oils.
15. Determination of pour and cloud points of lubricating oil.
16. Determination of Acid value of oil.

**Demo:**

1. Biodiesel from used cooking oil.
2. Construction of electrochemical cells.
3. Synthesis of semiconductors.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19BS1108** | |
| **Course Title: APPLIED 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 real time 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 LAB (B19HS1102)
**(Common to All Branches)**

**UNIT-I:** Pronunciation
Letters and Sounds
The Sounds of English
Phonetic Transcription

**UNIT-II:** Past tense markers
Word stress-di-syllabic words
Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms
Stress in compound words

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (B19CS1105)
### (Electronics & Communication Engineering)

### LIST OF EXPERIMENTS

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.

2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.
3.

Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( ) function.

Exercise 14:

1. 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
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name.
3. Write a program in C to remove a file from the disk.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1105** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB ()** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able design and development of C problem solving skills. |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program |

## ELECTRONICS AND COMMUNICATION ENGINEERING
## SYLLABUS : ENGLISH (B19HS1201)
### (Electronics & Communication Engineering)

**UNIT-I: Lesson: A Drawer full of happiness** from *Infotech English*, Maruthi Publications.

**Listening:** Listening to short audio texts and identifying the topic, context and specificpieces of information to answer a series of questions both in speaking and writing.

**Speaking:** Self- introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

**Reading:** Skimming text to get the main idea. Scanning to look for specific piecesof information.

**Reading for Writing:** Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

**Vocabulary:** Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

**Grammar:** Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

**Pronunciation**: Vowels, consonants, plural markers and their realizations

**UNIT-II: Lesson-: Nehru's letter to his daughter, Indira on her birthday** from *Infotech English*, Maruthi Publications**.**

**Listening:** Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

**Speaking**: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

**Reading**: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

**Reading for Writing**: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

**Vocabulary**: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

**Grammar**: Articles, prepositions and use of antonyms.

**Pronunciation**: Past tense markers, word stress-di-syllabic words.

**UNIT-III: Lesson**: **Stephen Hawking-Positivity 'Benchmark** 'from *InfoTech English*, Maruthi Publications.

**Listening**: Listening for global comprehension and summarizing what is listened to both in speaking and writing.

**Speaking**: Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: complaining and apologizing.

**Reading**: Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

**Reading for Writing:** Letter writing- types, format and principles of letter writing, E-mail etiquette, writing a Resume/CV and covering letter.

**Vocabulary**: Technical vocabulary from across technical branches (20 words.
GRE. Vocabulary 20 words), antonyms and synonyms, word applications, sequencing of words.

**Grammar**: Active and passive Voice, question Tags, direct and indirect speech, reporting for academic purposes.

**Pronunciation:** Word stress-poly-syllabic words.

**UNIT-IV: Lesson: Liking a Tree Unbowed: Wangari Maathai- biography** from Infotech English, Maruthi Publications.

**Listening:** Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

**Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

**Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display
Complicated data.

**Reading for Writing**: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, close encounters, foreign phrases.

**Grammar**: Quantifying expressions - adjectives and adverbs: comparing and contrasting; degrees of comparison.

**Pronunciation**: Contrastive Stress.

**UNIT-V: Lesson: Stay Hungry–Stay Foolish** from InfoTech English,Maruthi Publications.

**Listening:** Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

**Speaking:** Formal oral presentations on topics from academic contexts – with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

**Reading**: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.

**Reading for Writing**: Report writing, writing academic proposals- writing research articles: format and style.

**Vocabulary**: Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

**Grammar:** Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement).

**Pronunciation:** Stress in compound words

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS1201** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and Responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text And locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Understand and apply the principles of writing to paragraphs, arguments, essays And formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

# SYLLABUS: MATHEMATICS-III (B19BS1202)
## (Multivariable Calculus and Fourier analysis)
## (Common to CE, CSE, ECE, EEE & IT)

**UNIT-I: 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.

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

**UNIT-III: Single and Multiple integrals:** Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.

Double and triple integrals, change of variables, Change of order of integration.Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation**

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, 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) andrelated Problems.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1202** | |
| **Course Title: MATHEMATICS-III** | |
| **CO-1** | Determine Fourier series and half range series of functions. |
| **CO-2** | Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals. |
| **CO-3** | Use the knowledge of Beta and Gamma functions in evaluating improper integrals. |
| **CO-4** | Evaluate double integrals, simple triple integrals & find areas and volume. |
| **CO-5** | Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential. |
| **CO-6** | Apply Green's, Stokes' and Gauss divergence theorems to solve problems. |

## SYLLABUS: APPLIED PHYSICS (B19BS1203)
## (Common to CSE, ECE & IT)

**UNIT-I: WAVE OPTICS: Interference:** Principle of super position. Interference of light, interference in thin films (reflected light) – Wedge film and Newton`s rings – Applications

**Diffraction:** Types of diffraction, Fraunhoffer diffraction at a single alit, Diffraction grating, grating spectrum. Missing order, Resolving power, Rayleigh's Criterion, Resolving power of Grating, Telescope, Microscope (qualitative treatment only)

**UNIT-II: DIELECTRICS AND MAGNETICS: Dielectrics** : Introduction to dielectrics, Electric Polarization, Dielectric polarizability, Susceptibility, Dielectric constant, Types of Polarization, Frequency dependence of Polarization, Internal field in a dielectric, Claussius and Mosotti equation, Applications of dielectrics.

**Magnetics**: Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials, Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications.

**UNIT-III: LASERS AND FIBER OPTICS: Lasers**: Introduction, Interaction fof radiation with matter, condition for light amplification, Einstein's relations. Requirements of lasers device Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

**Fiber Optics**: Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

**UNIT-IV: SEMICONDUCTORS:** Introduction, intrinsic semi conductors, density of charge carries, Fermi energy, Electrical conductivity – Extrinsic semi conductors – P-type and N-type, Density of charge carriers, dependence of Fermi energy on carrier concentration and temperature, direct and indirect band – gap semi conductors, Hall effect, Applications of Hall effect. Drift and diffusion currents, Continuity equation, applications of semi conductors.

**UNIT-V: ULTRASONICS AND NANOMATERIALS: Ultrasonics:** Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating, applications of ultrasonics.

**Nanomaterials:** Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemicalvapour Deposition and Sol – Gel methods, Characterization techniques for Nano materials, Carbon nanotubes (CNTS), Applications ofNano materials.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1203** | |
| **Course Title: APPLIED PHYSICS** | |
| **CO-1** | **Interpret** the behavior of light radiation in interference and diffraction Phenomena and their applications. |
| **CO-2** | **Explain** the properties of dielectric and magnetic materials suitable for engineering applications. |
| **CO-3** | **Explain** the important aspects of semiconductors and electrical conductivity in them. |
| **CO-4** | **Understand** the basics of modern technologies lasers, optical fibers and Ultrasonic and their utility in various fields. |
| **CO-5** | **Demonstrate** the synthesis methods and applications of nano materials. |

## SYLLABUS: BASIC ELECTRICAL ENGINEERING (B19EE1202)

(Electronics & Communication Engineering)

**UNIT-I: DC CIRCUITS:** Electrical circuit elements (R - L and C), Types of sources- Ohms Law-Kirchhoff laws –Network reduction techniques (series, parallel, series-parallel and Star-Delta Transformations), Source transformation, Mesh analysis and nodal analysis-Simpleproblems.

**UNIT-II: AC CIRCUITS:** Representation of sinusoidal waveforms - Peak, Average and RMS values- Phasor representation - power factor - Analysis of single-phase ac circuits consisting ofpure resistor, pure inductor, pure capacitor, R-L, R-C, RLC series circuits-instantaneous power-real power - reactive power - apparent power.

**UNIT-III: D.C MACHINES:** Principle of operation of DC generator – emf equation – types of DC machines – OCC of DC shunt generator - Torque equation of DC motor- characteristics - applications –losses and efficiency - Brake test - Swinburne's test - speed control of d.c shunt motor- Simple Problems.

**UNIT-IV: AC MACHINES:** Principle and operation of Single-Phase Transformer –EMF equation-Equivalent circuit-OC and SC test on transformer. Principle and operation of Induction Motor-Torque equation-Slip-Torque characteristics-Brake test on Induction motor- SimpleProblems.

**UNIT-V: SPECIAL MACHINES:** Construction and Principle of operation of Single-phase induction motor, Stepper motor, Universal motor, BLDC motor

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EE1202** | |
| **Course Title: BASIC ELECTRICAL ENGINEERING** | |
| **CO-1** | Able to analyze the various Electrical networks |
| **CO-2** | Able to explain the operation of DC generator and analyze the characteristics of DC generator. |
| **CO-3** | Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the speed control methods of DC motors. |
| **CO-4** | Able to explain the operation of single-phase transformer and choose correct rating of a transformer for a specific application. |
| **CO-5** | Ability to analyze the performance and speed – torque characteristics of a 3-phase induction motor. |
| **CO-6** | Able to explain the operation of special machines |

## SYLLABUS: ENGINEERING DRAWING (B19ME1201)

(Common to CSE,ECE & IT)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only), 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 Second Semester Course** | |
|---|---|
| **Course Code: B19ME1201** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

## SYLLABUS: APPLIED PHYSICS LAB (B19BS1206)

(Common to CSE, ECE & IT)

**LIST OF EXPERIMENTS:**

1. Determination of the Wavelength of light from a source – Diffraction Grating – Normal incidence.
2. Determination of radius of curvature of Plano convex lens – Newton's Rings.
3. Determination of the thickness of a thin spacer using interference – Air Wedge method.
4. Determination of Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
6. Determination of Temperature Coefficient of Resistance of a thermistor
7. Determination of resistivity of semiconductors by Four probe method.
8. Determination of dielectric Constant by charging and discharging method.
9. Resolving power of a grating.
10. Determination of the velocity of sound - Volume Resonator method.
11. Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum.
12. Verification of the laws of vibrations in stretched stings - Sonometer.
13. Determination of Magnetic susceptibility by Quinke's method.
14. Study of variation of dielectric constant with temperature.
15. Determination of the frequency of the AC supply – AC Sonometer.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19BS1206** | |
| **Course Title: APPLIED 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: COMMUNICATION SKILLS LAB (B19HS1203)
**(Common to CSE& IT)**

**UNIT-I:** JAM, Common Errors, Neutralizing accent

**UNIT II:** Telephonic Etiquette, Role Plays, Poster Presentations

**UNIT-III:** Presentation Skills,Public Speaking, Data Interpretation

**UNIT-IV:** Group Discussion, Do's and Don'ts

**UNIT V**: Curriculum VitaeCovering Letter Interview Skills, Mock Interviews, FAQ's

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1203** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

# SYLLABUS: BASIC ELECTRICAL ENGINEERING LAB (B19EE1204)

(Electronics & Communication Engineering)

## LIST OF EXPERIMENTS

1. Verification of ohms law
2. Verification of KCL and KVL.
3. Parameters of Iron core inductor.
4. Magnetization characteristics of D.C. Shunt generator.
5. Speed control of D.C. shunt motor.
6. Brake test on DC shunt motor.
7. Brake test on DC series motor.
8. Swinburne's test on DC machine.
9. Load test on DC shunt generator.
10. OC & SC tests on single-phase transformer.
11. Load test on single-phase transformer.
12. Brake test on three phase induction motor.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19EE1204** | |
| **Course Title: BASIC ELECTRICAL ENGINEERING LAB** | |
| **CO-1** | Understand ohms law and Kirchhoff's laws |
| **CO-2** | To determine the parameters of iron core inductor |
| **CO-3** | Predetermine the performance of DC machines and transformers. |
| **CO-4** | Make use of DC shunt machines for applications. |
| **CO-5** | Evaluate the performance of 1-phase transformer. |
| **CO-6** | Perform brake test on 3-phase induction motor. |

## SYLLABUS: ELECTRONICS WORKSHOP PRACTICE (B19EC1201)

(Electronics & Communication Engineering)

**I. Identification and Testing of Components:**

a. Identify, Understand and draw the different circuit components & symbols used in Electronics labs.

b. Resistance value using colour code.

c. Bread-board and BNC Connectors.

d. Study & Identification of different switches and relays.

e. Classification of Active and Passive elements.

**II. Laboratory Equipment:**

a. Study of Power Supplies, DMM, Function Generator and CRO

b. Measurement of Voltage Amplitude & Frequency

c. Measurement of Inductance and Capacitance.

d. Measurement of Voltage & current with Series & Parallel connections.

**III. Soldering Practice:**

a. Solder practice with different components available in lab

b. A demo on PCB fabrication: (i) Artwork & printing of a simple PCB. (ii) Etching & drilling of PCB.

**IV. Introduction to Technical Softwares& Documentation Tools:**

a. EDA Tools: PSPICE demo

b. MATLAB Introduction: Demo, Signals & Plotting

c. Google Docs, Sheets, Slides and Forms for Documentation & Collaboration

**V. Hardware Boards & Personal Computer (PC) :**

a. Basics & Demonstration of Arduino & Raspberry Pi boards

b. Study of PC Hardware

c. PC Software installation (OS and Compilers)

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19EC1201** | |
| **Course Title: ELECTRONICS WORKSHOP PRACTICE** | |
| **CO-1** | Identify electronics components like resistors, capacitors, diodes, transistors etc. Assemble circuits on a breadboard, analyze the performance of the circuits,evaluate the results and confirm the validity of established concepts. |
| **CO-2** | Use measuring instruments like the multimeter and equipments such as Function generator, power supply & CRO. |
| **CO-3** | Solder and de-solder components on PCB. Understand PCB fabrication process and Fabricate PCBs . |
| **CO-4** | Gets familiar with technical softwares & Google documentation tools |
| **CO-5** | Gets familiar with electronics boards & PC hardware/software installation |

# SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19CS1206)

(Electronics & Communication Engineering)

**Apply Design thinking on the following Streams to**

**Project Stream 1**:

Electronics, Robotics, IOT and Sensors

**Project Stream 2**:

Computer Science and IT Applications

**Project Stream 3**:

Mechanical and Electrical tools

**Project Stream4**:

Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources,Agriculture, Environmental science and other fields of engineering.

## ELECTRONICS AND COMMUNICATION ENGINEERING
## SYLLABUS: ELECTRONIC DEVICES AND CIRCUITS (B19EC2101)

**UNIT-I: Semiconductor diode and its applications:** Potential variation in graded semiconductors. Open circuited PN junction, 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, characteristics of Tunnel diode and Zener diode. Half wave, Full wave and Bridge Rectifiers with and without filters, Ripple factor and regulation characteristics.

**UNIT-II : Bipolar junction transistors:** Operation of a transistor and transistor biasing for different operating conditions, transistor current components, transistor amplification factors: $\alpha,\beta,\gamma$ relation between $\alpha,\beta$ and $\gamma$ 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..

**UNIT-III: Transistor Biasing Circuits:** The operating point, Bias stability, different types of biasing techniques, stabilization against variation in $I_{co}$ , $V_{BE}$, & $\beta$. 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: B19EC2101** | |
| **Course Title: ELECTRONIC DEVICES AND CIRCUITS** | |
| **CO-1** | Analyze the characteristics and operation of Diode, BJT, JFET and MOSFET. |
| **CO-2** | Analyze the biasing circuits of BJT and JFET. |
| **CO-3** | Analyze the performance of small signal BJT and FET single stage amplifiers. |
| **CO-4** | Apply the gained knowledge in the design of simple Electronic circuits. |

## SYLLABUS: SWITCHING THEORY AND LOGIC DESIGN (B19EC2102)

**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 Errorcorrecting codes. Fundamentals of Boolean Algebra and Logic Gates, Boolean theorems andproofs.

**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 Adder, Subtractor, Decoders, Encoders, Multiplexers, Demultiplexers, Code Convertors, Priority Encoders, Seven – segment Displays, 4-bit digital Comparators and realization of Boolean functions with PLDs.

**UNIT-IV: Sequential Logic Circuits and Design:** RS & SR latches, clocked RS, SR, JK, T & D Flip-flops with pre-set and clear inputs. Race around problem, MS-JK-FF, 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. Design of Ring counters and Johnson counters.

**UNIT-V: Asynchronous and Synchronous Sequential Circuits:** Design of Asynchronous counters (Ripple counters) for any modulus. Design of Synchronous counters using SR, JK, T and D-FFs. Analysis and Design of Synchronous Sequential Circuits with State Diagrams and State Reduction. Design of sequence detectors and generators. Basics of Asynchronous Sequential Circuits.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EC2102** | |
| **Course Title: SWITCHING THEORY AND LOGIC DESIGN** | |
| **CO-1** | To convert one number system to another, analyze logic gates and Boolean theorems. |
| **CO-2** | To analyze digital circuits using different minimization techniques. |
| **CO-3** | To design various combinational and sequential circuits along with applications. |
| **CO-4** | To design counters and state machines by applying the knowledge of synchronousand asynchronous sequential circuits. |

## SYLLABUS: SIGNALS AND SYSTEMS (B19EC2103)

**UNIT-I: Introduction to Continuous –Time and Discrete –Time signals and systems:** Continuous–Time and Discrete–Time signals, Signal Energy and Power, Periodic Signals, Even and odd Signals, Continuous-Time complex Exponential and Sinusoidal Signals, Discrete–Time complex Exponential and Sinusoidal Signals and their Periodicity, The Continuous–Time and Discrete–Time Unit Impulse and Unit step Functions, Continuous– Time and Discrete–Time Systems, Operations on signals, Interconnections of Systems, Basic System Properties, Continuous–Time and Discrete Time LTI Systems: The Graphical interpretation of Convolution Integral and The Convolution Sum, Causal LTISystems Described by Differential and Difference Equations, Singularity Functions.
MATLAB Demos (one or two examples for illustration purpose only)*.

**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 time periodic 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 coefficient difference equations (Elementary Level on DTFT). MATLAB Demos(one or two examples for illustration purpose only)*

**UNIT-IV: Laplace Transform**
Introduction, The Laplace Transform, 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 discrete systems using the Z-Transforms. MATLAB Demos (one or two examples for illustration purpose only)*.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EC2103** | |
| **Course Title: SIGNALS AND SYSTEMS** | |
| **CO-1** | Outline the basic concepts of signals and systems. |
| **CO-2** | Analyze the spectral characteristics of Continuous Time and Discrete Time periodic and a periodic 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** | Outline the process of sampling and the effects of under sampling. |

## SYLLABUS: PROBABILITY THEORY AND RANDOM PROCESSES (B19EC2104)

**UNIT-I: Probability Theory:** Definitions of Probability, Axioms of Probability, Probability Spaces and Properties ofProbabilities, 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, Stationary, 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, Spectral characteristics of system Response, Gaussian processes, Poisson Processes, Low-pass andBand pass Noise Representation.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EC2104** | |
| **Course Title: PROBABILITY THEORY AND RANDOM PROCESSES** | |
| **CO-1** | Demonstrate 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 acquire the concept of inequalities and probabilistic limits. |
| **CO-4** | Assimilate the concept of Random process and determine covariance and spectral density of stationary random processes. |
| **CO-5** | Identify specific applications to Poisson and Gaussian processes, and Analyze the response of random inputs to linear time invariant systems. |

## SYLLABUS: NETWORK ANALYSIS (B19EE2105)

**UNIT-I: Network Theorems:** Review of Dc circuits, Superposition, Thevenin's, Norton's, Reciprocity, Max PowerTransfer theorems.

**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: Analysis of AC Networks:** Review of ac circuits, Node and mesh analysis, Superposition, Thevenin's, Max PowerTransfer theorems.
**Resonance:** Series and parallel resonance, selectivity, band width and Quality factor, locus diagram.

**UNIT-IV: Two-port Networks:** Introduction, Z-parameters, Y-parameters, Transmission line parameters, h-parameters, Relationship between various parameters, series, parallel & cascade connection of two portnetworks.

**UNIT-V: Network Functions**: Network functions for single port and two port, Calculation of Network functions for Ladder and General Networks, Poles and Zeroes, Restriction of Poles and Zeroes for Driving point and Transfer functions, Time Domain Behavior from Pole-Zero plot, Routh-Hurwitz criterionof stability of network function.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EE2105** | |
| **Course Title: NETWORK ANALYSIS** | |
| **CO-1** | **Apply** network theorems to solve the DC electrical circuits. |
| **CO-2** | **Analyze** the transient behavior of circuits by **applying** first and second order Differential equations. |
| **CO-3** | **Apply** network theorems to solve AC circuits and calculate resonance parameters. |
| **CO-4** | **Calculate** two port network parameters for the given network. |
| **CO-5** | **Determine** the network functions for Ladder and General Networks and analyze Stability of electric circuits using Routh's Hurwitz criterion. |

## SYLLABUS: DATA STRUCTURES (B19 CS 2108)

**UNIT-I: Linear Data Structures: Arrays, Stacks and Queues:** Data Structures -Operations-Abstract Data Types-Complexity of Algorithms-Time and Space Arrays-Representation of Arrays-Linear Arrays-Insertion–Deletion and Traversal of a Linear Array-Array as an Abstract Data Type-Multi-Dimensional arrays-Strings-String Operations Storing Strings-String as an Abstract Data Type
Stack -Array Representation of Stack-Stack Abstract Data Type-Applications of Stacks: Prefix Infix and Postfix Arithmetic Expressions-Conversion-Evaluation of Postfix Expressions Recursion-Towers of Hanoi-Queues-Definition-Array Representation of Queue-The Queue Abstract Data Type-Circular Queues-Dequeues-Priority Queues.

**UNIT-II: Linked Lists:** Pointers-Pointer Arrays-Linked Lists-Node Representation-Single Linked List-Traversingand Searching a Single Linked List-Insertion into and Deletion from a Single Linked List- Header Linked Lists-Circularly Linked Lists-Doubly Linked Lists-Linked Stacks andQueues Polynomials-Polynomial Representation-Sparse Matrices.

**UNIT-III: Trees:** Terminology-Representation of Trees-Binary Trees-Properties of Binary Trees-Binary Tree Representations-Binary Tree Traversal-Preorder-Inorder and Postorder Traversal-Threads Thread Binary Trees-Balanced Binary Trees-Heaps-Max Heap-Insertion into and Deletion from a Max Heap-Binary Search Trees-Searching-Insertion and Deletion from a Binary Search Tree Height of Binary Search Tree, m-way Search Trees, B-Trees.

**UNIT-IV: Graphs:** Graph Theory Terminology-Graph Representation-Graph Operations-Depth First Search-Breadth First Search-Connected Components-Spanning Trees-Biconnected Components- Minimum Cost Spanning Trees-Kruskal's Algorithm-Prism's Algorithm-Shortest Paths- Transitive Closure-All Pairs Shortest Path-Warshall's Algorithm

**UNIT-V: Searching and Sorting:** Searching -Linear Search-Binary Search-Fibonacci Search-Hashing-Sorting-Definition- Bubble Sort-Insertion sort-Selection Sort-Quick Sort-Merging-Merge Sort-Iterative and Recursive Merge Sort-Shell Sort-Radix Sort-Heap Sort.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19EE2105** | |
| **Course Title: NETWORK ANALYSIS** | |
| **CO-1** | **Apply** advanced data structure strategies for exploring complex data structures and implement data structures like stacks, queues |
| **CO-2** | **Implement** & perform operations on dynamic linear data structures like linked lists. |
| **CO-3** | **Apply** different operations on trees and graphs. |
| **CO-4** | **Implement** & analyze various searching &sorting algorithms |

# SYLLABUS: ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION) (B19EC2105)

**(Common to ECE & EEE)**

## LIST OF EXPERIMENTS

1. Study and Analyze V-I Characteristics of Semiconductor Diode (Ge & Si), LED and Zener Diode.
2. Determination of Ripple Factor and Regulation Characteristics of Half Wave and Full Wave Rectifier With and Without Filter.
3. Study and Analyze The Characteristics of BJT in CE Configuration and determination of h- parameters.
4. Study and Analyze The JFET Characteristics.
5. Design of Biasing Circuits for BJT and FET.
6. Design of simple amplifier circuits using BJT.
7. Design of electronic circuits using FET.

## 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 Characteristics of Tunnel Diode.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| Course Code: B19EC2105 | |
| Course Title : ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION) | |
| **CO-1** | Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters. |
| **CO-2** | Analyze the performance of rectifier circuits with and without filters. |
| **CO-3** | Analyze the performance of BJT and FET amplifier circuits. |
| **CO-4** | Simulation and Design of small electronic circuits using BJT and FET. |

# SYLLABUS: SWITCHING THEORY AND LOGIC DESIGN - LAB (WITH SIMULATION) (B19EC2106)

## LIST OF EXPERIMENTS:

1. Verify the operation of the following using basic logic gate ICs.
   a. Full adder.
   b. Full subtractor.
2. Verify the logic functions of 8:1 Multiplexer using IC 74151 and 1:16 Demultiplexer using IC 74154.
   a. Implement the given function using 8:1Multiplexer.
   b. Convert 1:16 Demultiplexer into a 4:16 Decoder and implement the given function.
3. Verify the given code convertors using digital trainer kit
   a. Implement BCD to Seven segment decoder driver using IC 74147 and Seven segment Display.
   b. 8 to 3 Priority encoder using IC 74148.
4. Verify the operation of following flip-flops using Digital Trainer Kit
   a. SR-latch & RS-latch.
   b. JK- flip flop using IC 7476 along with direct inputs.
   c. D- flip flop.
   d. T- flip flop.
5. Design and verify the following counters using Digital Trainer Kit
   a. Mod-16 Ripple counter using IC7493.
   b. Mod-8 Synchronous counter using 7476 and 7408 ICs.
   c. Decade (Mod-10) counter using IC7493.
6. Verify the functioning of 5 bit shift register IC7496 using Digital Trainer Kit.

**SOFTWARE:**

7. Verify the operation of following digital components using Vivado Simulator
   a. Full adder
   b. Full subtractor.
8. Verify the operation of 8:1multiplexer and 8:3 priority encoder using Vivado Simulator.
9. Design 4-bit ALU and verify some arithmetic and logical operations using Vivado Simulator.
10. Design Mod-16 ripple and Mod-8 synchronous counters using Vivado Simulator.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19EC2106** | |
| **Course Title: SWITCHING THEORY AND LOGIC DESIGN - LAB (WITH SIMULATION)** | |
| **CO-1** | Analyze and design basic combinational logic circuits using Digital IC's and HDL Programming. |
| **CO-2** | Implement basic sequential logic circuits using Digital IC's and HDL Programming. |

## ELECTRONICS AND COMMUNICATION ENGINEERING

## SYLLABUS: ELECTRONIC CIRCUIT ANALYSIS (B19 EC 2201)

**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 Bandwidth of Multistage Amplifiers.

**UNIT-II: Feedback Amplifiers:** Concept of Feedback 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 andWien bridge Oscillators. LC Oscillators: Hartley, Colpitts, Clapp, Tuned Collector and Crystal Oscillators.

**UNIT-IV: Power 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 in Pure Class-B Power Amplifier and Class-AB Power Amplifier- Trickle Bias, Derating Factor and Heat Sinks – Complementary Push Pull Amplifier.

**Tuned Voltage Amplifiers:** Analysis of Single tuned, Double tuned and Stagger Tuned Amplifiers with gain andBandwidth 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: B19 EC 2201** | |
| **Course Title: ELECTRONIC CIRCUIT ANALYSIS** | |
| **CO-1** | Outline the concepts of multistage amplifiers, feedback amplifiers, power amplifiers, tuned amplifiers, operational amplifiers and oscillators. |
| **CO-2** | Apply the concepts in the realization of practical circuits. |
| **CO-3** | Analyze and design practical electronic circuits using amplifiers, oscillators and Operational amplifiers. |

## SYLLABUS: ELECTROMAGNETIC WAVES & TRANSMISSION LINES (B19EC2202)

**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, Boundary conditions on $E$ & $D$ at the interface between two media, Related Problems.

**UNIT-II: Magnetostatics:** Introduction, Biot-savar'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 magneticfields, scalar and vector magnetic potentials, Forces due to magnetic fields, Magnetization in materials, Boundary conditions on $H$ &$B$ at the interface between two media, Related problems.

**UNIT-III: Time varying fields and Maxwell's equations:** Introduction, Faraday's law of electromagnetic induction, Maxwell's equations in integral and differential forms, 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 incidences, Reflection of plane waves by a perfect dielectric for normal incidences, Brewster angle and critical angle, Poyntin's theorem, Related Problems.

**UNIT-V: Transmission lines and Rectangular Waveguides:** 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, 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: B19EC2202** | |
| **Course Title: ELECTROMAGNETIC WAVES & TRANSMISSION LINES** | |
| **CO-1** | Illustrate the behaviour of static electric and magnetic fields in different media for different charge and current distributions. |
| **CO-2** | Apply Maxwell's equations to describe the behaviour of time varying electromagnetic fields. |
| **CO-3** | Apply Maxwell's equations to describe the EM wave propagation in free space and across different media. |
| **CO-4** | Compute different transmission line and waveguide parameters. |

# SYLLABUS: ANALOG COMMUNICATIONS (B19EC2203)

**UNIT-I: AMPLITUDE MODULATION:** Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Definition, Time domain and frequency domain description, Single tone modulation, Power relations in AM waves, Generation of AM waves, Square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

**UNIT-II: DSB & SSB MODULATION:** Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSB-SC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop. Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial sideband modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems, FDM.

**UNIT-III: ANGLE MODULATION:** Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop. Comparison of FM & AM.

**UNIT-IV: TRANSMITTERS & RECEIVERS:** Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting. Communication Receivers, extensions of super heterodyne principle and additional circuits.

**UNIT-V: NOISE:** Review of noise and noise sources, noise figure, Noise in Analog communication Systems Noise in DSB & SSB System, Noise in AM System, Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

**PULSE MODULATION:** Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulationof PPM, Time Division Multiplexing, TDM Vs FDM.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19EC2203** | |
| **Course Title: ANALOG COMMUNICATIONS** | |
| **CO-1** | Differentiate various Analog modulation and demodulation schemes. |
| **CO-2** | Analyze the concepts of analog modulation techniques in time and frequency domains. |
| **CO-3** | Identify the functional blocks of transmitters and receivers. |
| **CO-4** | Analyze and compare the performance of various analog modulation techniques in the presence of noise. |
| **CO-5** | Differentiate various Pulse modulation and demodulation techniques. |

## SYLLABUS: COMPUTER ARCHITECTURE AND ORGANIZATION (B19EC2204)

**UNIT-I: Register Transfer and Micro operations:** Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logical Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

**UNIT-II: Basic Computer Organization:** Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input - Output and Interrupt, CompleteComputer Description.

**UNIT-III: Micro programmed Control & CPU Organization:** Micro programmed Control: Control Memory, Address Sequencing, MicroinstructionFormats, Micro program Example, Design of Control Unit.
CPU Organization: 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, Input - Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input- Output processor, CPU-IOP communication.

**UNIT-V: Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, CacheMemory, Virtual Memory.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EC2204** | |
| **Course Title: COMPUTER ARCHITECTURE AND ORGANIZATION** | |
| **CO-1** | Analyze how computers represent and manipulates data. |
| **CO-2** | Develop the general architecture design of a digital computer. |
| **CO-3** | Acquiring the knowledge of designing microprograms for few basic instructions |
| **CO-4** | Develop independent learning skills to interface main memory & I/O. |

## SYLLABUS: OOPS THROUGH JAVA (B19CS2209)
### (Common to ECE & EEE)

**UNIT-I: INTRODUCTION TO JAVA:** 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: OBJECTS AND CLASSES:** Classes and objects, class declaration, creating objects, methods, constructors andconstructor overloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

**UNIT-III: INHERITANCE:** 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 to files, random access file.

**UNIT-V: APPLETS AND AWT CLASSES:** 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 First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS2209** | |
| **Course Title: OOPS THROUGH JAVA** | |
| **CO-1** | **Apply** object-oriented programming principles and various java programming constructs and develop java programs. |
| **CO-2** | **Apply** the concepts of Inheritance, Polymorphism and String handling methods in developing java programs |
| **CO-3** | **Apply** the concepts like interfaces, packages, exception handling and multithreading in programming to develop error free programs. |
| **CO-4** | **Develop** the GUI applications for the end users using applets with event handling. |

## SYLLABUS: MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR (B19HS2201)
### (Common to ECE & EEE)

**UNIT-I: Introduction to Management: Management:** Concept, Nature and importance of Management, Functions of management, Evolution of Management thought, Taylor's Scientific Management, Fayol's principles of Management, Social Responsibility of Business.

**UNIT-II: Functional Management: Human Resource Management (HRM)**: Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Compensation & Performance Appraisal.
**Marketing Management:** Concept, Functions of marketing; Marketing Mix - Product, Price, Place & Promotion; Marketing strategies based on Product life cycle, Channels of distribution.

**UNIT-III: Strategic Management:** Vision, Mission, Goal, Objective, Policy, Strategy. Elements of Corporate planning process; Environmental scanning; SWOT analysis; steps in Strategy formulation, implementation, evaluation & control; Bench Marking; Balanced Score Card.

**UNIT-IV: Organizational Behavior:** Individual Behavior: Perception-Perceptual process; Attitude- Attitudinal change, Organizational Change, Factors Influencing Change, Types of Change.
**Motivation**: Meaning, Theories of Motivation - Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation.

**UNIT-V: Group Dynamics:** Types of Groups, Stages of Group development; **Organizational conflicts** - Reasons for Conflicts, Consequences of Conflicts in Organization, Types of Conflicts, Strategies for Managing Conflicts, Stress - Causes and effects, coping strategies of stress.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS2201** | |
| **Course Title: MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR** | |
| **CO-1** | Explain management functions and principles. |
| **CO-2** | Will be able to describe the concepts of functional management that is HRM and Marketing functions. |
| **CO-3** | Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends. |
| **CO-4** | The learner is able to recognize strategically contemporary management practices and describe corporate planning process. |
| **CO-5** | The learner can discuss about individual behavior and motivational theories. |
| **CO-6** | The student can explain about ways in managing conflicts and stress. |

## SYLLABUS: ELECTRONIC CIRCUIT ANALYSIS LAB (WITH SIMULATION) (B19EC2205)

**LIST OF EXPERIMENTS (HARDWARE)**

1. Frequency Response of RC Coupled Amplifier.
2. Frequency Response of Negative Feedback Amplifier.
3. Colpitts Oscillator.
4. RC Phase Shift Oscillator.
5. Wein Bridge Oscillator.
6. Hartley Oscillator.
7. Basic Applications of Operational Amplifier.
8. Tuned Voltage Amplifier.

**SOFTWARE:**

1. Frequency Response of RC Coupled Amplifier.
2. Frequency Response of Negative Feedback Amplifier.
3. Colpitts Oscillator.
4. RC Phase Shift Oscillator.
5. Wein Bridge Oscillator.
6. Hartley Oscillator.
7. Basic Applications of Operational Amplifier.
8. Tuned Voltage Amplifier.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EC2205** | |
| **Course Title: ELECTRONIC CIRCUIT ANALYSIS LAB(WITH SIMULATION) ()** | |
| **CO-1** | Apply the concepts of amplifier analysis to verify their characteristics and measure the important parameters. |
| **CO-2** | Analyze the performance of power amplifiers. |
| **CO-3** | Analyze the frequency response and characteristics of operational amplifiers. |
| **CO-4** | Simulation and Design of different amplifiers and oscillator circuits. |

## SYLLABUS: ANALOG COMMUNICATIONS - LAB (WITH SIMULATION) (B19EC2206)

### LIST OF EXPERIMENTS

1. Amplitude Modulation and Demodulation.
   (Hardware implementation, MATLAB simulation)
2. Frequency Modulation and Demodulation.
   (MATLAB and Multisim simulation)
3. Balanced Modulator.
   (Hardware implementation, MATLAB simulation)
4. Harmonic Generator.
   (Hardware implementation)
5. Pre-Emphasis and De-Emphasis.
   (Hardware implementation)
6. RF Amplifier.
   (Hardware implementation)
7. Design Of Active Low Pass and High Pass Filter.
   (Hardware implementation)
8. Design Of Twin-T Network.
   (Hardware implementation)
9. Pulse Modulation Techniques.
   (Hardware implementation, MATLAB simulation)
10. Spectrum Analysis of AM & FM Signals.
    (MATLAB simulation)
11. Frequency Division Multiplexing.
    (MATLAB simulation)
12. Simulation of AWGN Channel.
    (MATLAB simulation)

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19EC2206** | |
| **Course Title: ANALOG COMMUNICATIONS - LAB (WITH SIMULATION)** | |
| **CO-1** | Design and implement modulation and demodulation circuits for amplitude modulation and frequency modulation techniques. |
| **CO-2** | Design second order active filters for various frequency bands. |
| **CO-3** | Construct the circuit and study the characteristics of different transmitter andreceiver circuits such as Harmonic generator, RF Amplifier, pre-emphasis and de-emphasis. |

# ELECTRICAL AND ELECTRONICS ENGINEERING

## ELECTRICAL AND ELECTRONICS ENGINEERING
## SYLLABUS: ENGLISH (B19HS1101)
(Common to CE, CSE, EEE, IT & ME)

**UNIT-I:** Lesson: A Drawer full of happiness from *Infotech English*, Maruthi Publications.

Listening: Listening to short audio texts and identifying the topic, context and specificpieces of information to answer a series of questions both in speaking and writing.

Speaking: Self- introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

Grammar: Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

Pronunciation: Vowels, consonants, plural markers and their realizations

**UNIT-II** : Lesson-: Nehru's letter to his daughter, Indira on her birthday from *Infotech English*, Maruthi Publications.

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

Grammar: Articles, prepositions and use of antonyms.

Pronunciation: Past tense markers, word stress-di-syllabic words.

**UNIT-III**: Lesson: Stephen Hawking-Positivity' Benchmark' from *Infotech English*, Maruthi Publications.

Listening: Listening for global comprehension and summarizing what is listened to both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting whatis discussed.

Functional English: complaining and apologizing.

Reading: Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

Reading for Writing: Letter writing- types, format and principles of letterwriting, E-mail etiquette, writing a Resume/CV and covering letter.

Vocabulary: Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, wordapplications, sequencing of words.

Grammar: Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).

Pronunciation: Word stress-poly-syllabic words.

**UNIT-IV**: Lesson: Liking a Tree, Unbowed: Wangari Maathai biography from *Infotech English*, Maruthi Publications.

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.

Grammar: Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.

Pronunciation: Contrastive Stress.

**UNIT-V**: Lesson: Stay Hungry–Stay Foolish from *Infotech English*, Maruthi Publications.

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts–with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.

Reading for Writing: Report writing, writing academic proposals- writing researcharticles: format

and style.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

Grammar: Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).

Pronunciation: Stress in compound words.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1101** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Understand and apply the principles of writing to paragraphs, arguments, essays and formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

## SYLLABUS: MATHEMATICS-I (B19BS1101)
## (LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS)
### (Common to All Branches)

**UNIT-I: Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II: Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS – I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve linear ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits. |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform and inverse Laplace transform and solve linear ODE. |

## SYLLABUS: APPLIED PHYSICS (B19 BS1104)

(Electrical and Electronics Engineering)

**UNIT-I: WAVE OPTICS Interference:** Principle of super position. Interference of light, interference in thin films(reflected light) – Wedge film and Newton`s rings – Applications

**Diffraction:** Types of diffraction, Fraunhoffer diffraction at a single alit, Diffractiongrating, grating spectrum. Missing order, Resolving power, Rayleigh's Criterion, Resolving power of Grating, Telescope, Microscope (qualitative treatment only)

**UNIT-II: DIELECTRICS AND MAGNETICS: Dielectrics** : Introduction to dielectrics, Electric Polarization, Dielectric polarizability, Susceptibility, Dielectric constant, Types of Polarization, Frequency dependence of Polarization, Internal field in a dielectric, Claussius and Mosotti equation, Applications of dielectrics.

**Magnetics:** Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials, Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications.

**UNIT-III: LASERS AND FIBER OPTICS: Lasers**: Introduction, Interaction fof radiation with matter, condition for light amplification, Einstein's relations. Requirements of lasers device Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

Fiber Optics: Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

**UNIT-IV: SEMICONDUCTORS:** Introduction, intrinsic semi conductors, density of charge carries, Fermi energy, Electrical conductivity – Extrinsic semi conductors – P-type and N-type, Density of charge carriers, dependence of Fermi energy on carrier concentration and temperature, direct and indirect band – gap semi conductors, Hall effect, Applications of Hall effect. Drift and diffusion currents, Continuity equation, applications of semi conductors.

**UNIT-V: ULTRASONICS AND NANOMATERIALS:** Ultrasonics: Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating, applications of ultrasonics.

Nanomaterials: Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemical vapour Deposition and Sol – Gel methods, Characterization techniques for Nano materials, Carbon nanotubes (CNTS), Applications of Nano materials.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1104** | |
| **Course Title: APPLIED PHYSICS** | |
| **CO-1** | Interpret the behavior of light radiation in interference and diffraction Phenomena and their applications. |
| **CO-2** | Explain the properties of dielectric and magnetic materials suitable for engineering applications. |
| **CO-3** | Explain the important aspects of semiconductors and electrical conductivity in them. |
| **CO-4** | Understand the basics of modern technologies lasers, optical fibers and ultrasonics and their utility in various fields. |
| **CO-5** | Demonstrate the synthesis methods and applications of nano materials. |

## SYLLABUS: FUNDAMENTALS OF COMPUTERS (B19CS1103)

(Electrical and Electronics Engineering)

**UNIT-I: Introduction:** History of digital computers, types of computers, block diagram of digital computers, various parts of a digital computer, Computer Programming- Machine Language, Assemblylanguage and high-level Language Programming.

**UNIT-II: Number System:** Binary, Octal, Decimal and Hexa decimal numbers systems, Conversion of numbers from one system to other system, fixed and floating-point representation of numbers, additionand subtraction, multiplication algorithms, division algorithms, floating-point Arithmetic operations.

**UNIT-III: Memory and Peripherals: Memories:** Need for memory, Types of Computer Memories-magnetic, Dynamic and static memories, Ram, ROM, EPROM and EEPROM Memories, Cache memory, Concept of Virtual memory.

**Peripheral Devices:** Working of Keyboard and Mouse, Types of Printers and its working, IO ports, Addressing I/o devices-Programmed I/O, interrupt I/O, DMA.

**UNIT-IV**: **Computer Organization:** Organization of a processor-Registers, ALU and Control unit, Register transfer language, micro operations, instruction codes, Computer instruction formats, Instruction cycle, Memory Reference Instructions, Input-Output instructions, Control Memory, Address sequencing, Design of control unit-micro programmed control, hardwired control.

**UNIT-V: Applications:** Various applications of Computer, Networking of Computers-LAN,WAN,MAN, Internet,Internet of things(IoT) applications to electrical engineering.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1103** | |
| **Course Title: FUNDAMENTALS OF COMPUTERS** | |
| **CO-1** | The student will be understood functioning of computers |
| **CO-2** | The student will convert numbers from one type to other type of system. |
| **CO-3** | The student will distinguish between different types of memories and learn the mapping of I/O devices |
| **CO-4** | The student will demonstrate the internal organization of digital |
| **CO-5** | Apply digital computer for storing electrical engineering problems |

## SYLLABUS: ENGINEERING DRAWING (B19ME1101)

(Common to CE, EEE & ME)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on **circles**.

**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only),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: B19ME1101** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

# SYLLABUS: APPLIED PHYSICS LAB (B19BS1107)

(Electrical and Electronics Engineering)

1. Determination of the Wavelength of light from a source – Diffraction Grating – Normal incidence.
2. Determination of radius of curvature of Plano convex lens – Newton's Rings.
3. Determination of the thickness of a thin spacer using interference – Air Wedge method.
4. Determination of Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
6. Determination of Temperature Coefficient of Resistance of a thermistor
7. Determination of resistivity of semiconductors by Four probe method.
8. Determination of dielectric Constant by charging and discharging method.
9. Resolving power of a grating.
10. Determination of the velocity of sound - Volume Resonator method.
11. Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum.
12. Verification of the laws of vibrations in stretched stings - Sonometer.
13. Determination of Magnetic susceptibility by Quinke's method.
14. Study of variation of dielectric constant with temperature.
15. Determination of the frequency of the AC supply – AC Sonometer.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1107** | |
| **Course Title: APPLIED 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 LAB (B19HS1102)

(Common to All Branches)

**UNIT-I:** Pronunciation

Letters and Sounds

The Sounds of English

Phonetic Transcription

**UNIT-II:** Past tense markers

Word stress-di-syllabic words

Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms

Stress in compound words

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: ELECTRICAL ENGINEERING WORKSHOP (B19EE1102)

(Electrical and Electronics Engineering)

1. To study the various electrical tools, symbols and abbreviations.
2. To identify the different types of cables/wires and switches, Fuses, & fuse carriers, MCB and ELCB, MCCB with ratings and usage.
3. To study of electrical safety and precautions.
4. Identification of terminals of various semi conducting devices
5. Measurement of resistance for a given resistor using the color-coding method.
6. Electrical wiring connection for fluorescent lamp.
7. Two lamps control using two individual switches.
8. One lamp control using 1-way switch
9. One lamp control using 2-way switches (Staircase wiring).
10. Wiring of power distribution using single phase MCB distribution board with ELCB, main switch and single-phase energy meter.
11. Wiring of backup power supply, including inverter, battery and load for domestic installation.
12. Verification of logic gates (OR, AND, OR, NOT, NAND, EX-OR).

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19EE1102** | |
| **Course Title: ELECTRICAL ENGINEERING WORKSHOP** | |
| **CO-1** | Explain the limitations, tolerances, safety aspects of electrical systems and wiring. |
| **CO-2** | Select wires/cables and other accessories used in different types of wiring. |
| **CO-3** | Make simple lighting and power circuits. |

## CIVIL ENGINEERING

### SYLLABUS: MATHEMATICS – II (B19BS1201)

### (NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)

(Common to CE, EEE, & ME)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton-Raphson method.

Trapezoidal rule, Simpson's 1/3 rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth orderRunge-Kutta method.

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.

Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method.Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation. Solutions of Linear homogeneousand non-homogeneous partial differential equations with constant coefficients – source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the D'Alembert'ssolution, one- dimensional heat equation

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1201** | |
| **Course Title: MATHEMATICS–II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numerically certain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation |

## SYLLABUS: MATHEMATICS-III (B19BS1202)

(Multivariable Calculus and Fourier analysis)
(Common to CE, CSE, ECE, EEE & IT)

**UNIT-I: 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.

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

**UNIT-III: Single and Multiple integrals:** Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.
Double and triple integrals, change of variables, Change of order of integration.Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation:** Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, 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) andrelated Problems.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1202** | |
| **Course Title: MATHEMATICS-III** | |
| **CO-1** | Determine Fourier series and half range series of functions. |
| **CO-2** | Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals. |
| **CO-3** | Use the knowledge of Beta and Gamma functions in evaluating improper integrals. |
| **CO-4** | Evaluate double integrals, simple triple integrals & find areas and volume. |
| **CO-5** | Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential. |
| **CO-6** | Apply Green's, Stokes' and Gauss divergence theorems to solve problems. |

## SYLLABUS: APPLIED CHEMISTRY (B19BS1205)
(Electrical and Electronics Engineering)

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:** Polymerization Definition, Types of Polymerization, free radical 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: Energy Sources and Applications: Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications of radicative materials Solar Photovoltaic cell- Thermal fuels – Introduction – Classification – Calorific value – HCV and LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by Otto Hoffman's by Product Process , Refining crude oil; Knocking; Chemical structure Knocking, Octane number of glassline, Cetane number of diesel oil, synthetic Petrol; LPG, CNG

**UNIT-III: Electrochemical cells and Corrosion:** Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel 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. Indian standards and WHO standards of drinking water. Design of drinking water plant.

**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 chemistryof 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: B19BS1205** | |
| **Course Title: APPLIED CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: PROGRAMMING FOR PROBLEM SOLVING USING C (B19CS1201)

(For CE,EEE & ME)

**UNIT-I: Introduction to Computers:** Computer Systems, Computing Environments, Computer languages**,** Creating and running Programs, Computer Numbering System, Storing Integers,Storing Real Numbers

**Introduction to the C Language:** Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

**Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

**UNIT-II: Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection, Multiway Selection, More Standard Functions

**Repetition:** Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

**UNIT-III: Arrays:** Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

**Strings:** String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

**Enumerated, Structure, and Union:** The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application.

**UNIT-IV: Pointers:** Introduction, Pointers to pointers, Compatibility, L value and R value

**Pointer Applications:** Arrays, and Pointers, Pointer Arithmetic and Arrays, MemoryAllocation Function, Array of Pointers, Programming Application

**Processor Commands**: Processor Commands

**UNIT-V: Functions:** Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointersto Functions, Recursion

**Text Input / Output:** Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

**Binary Input / Output:** Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS1201** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C** | |
| **CO-1** | Students will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program |
| **CO-2** | Students will learn to use different operators, data types and loops for developing C Programs. |
| **CO-3** | Students will able to write programs using Arrays ,Strings, enumerated types, Structure and Union |
| **CO-4** | Students will able to design and implement programs to analyze the different pointer applications |
| **CO-5** | Students will able to decompose a problem into functions and to develop modular reusable code |

## SYLLABUS: CIRCUIT THEORY (B19EE1201)

(Electrical & Electronics Engineering)

**UNIT-I: Introduction to Electrical Circuits:** Basic Concepts of passive elements of R, L, C 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 to DC networks with dependent and independent voltage and current sources.

**UNIT-II: 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-III: 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 and apparent power, waveform of instantaneous power and complex power.

**UNIT-IV: Analysis of AC Networks:** Extension of node and mesh analysis to AC networks, series and parallel resonance,selectivity, band width and Quality factor, locus diagram.

**UNIT-V: Network theorems (DC & AC Excitations):** Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfertheorem, Reciprocity theorem

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EE1201** | |
| **Course Title: CIRCUIT THEORY** | |
| **CO-1** | Able to analyze various electrical networks in presence of active and passive elements. |
| **CO-2** | Able to understand the principles of Magnetic circuits and dot convention. |
| **CO-3** | Able to Solve R, L and C networks with sinusoidal excitation. |
| **CO-4** | Able to evaluate the frequency response of RLC networks. |
| **CO-5** | Able to apply various network theorems to Electrical networks. |

## SYLLABUS: APPLIED CHEMISTRY LAB (B19BS1208)

(Electrical & Electronics Engineering)

**LIST OF EXPERIMENTS:**

1. Introduction of Chemistry Laboratory.
2. Estimation of HCL using standard Sodium Hydroxide.
3. Determination of total hardness of water by EDTA method.
4. Estimation of Ferrous Iron by KMnO4.
5. Estimation of oxalic acid by KMnO4.
6. Estimation of Mohr's salt by K2Cr2O7.
7. Estimation of Dissolved oxygen by Winkler's method.
8. Determination of pH by pH meter and universal indicator method.
9. Conductometric titration of strong acid Vs strong base.
10. Conductometric titration of strong acid Vs weak base.
11. Potentionmetric titration of strong acid Vs strong base.
12. Potentionmetric titration of strong acid Vs weak base.
13. Preparation of Phenol formaldehyde resion.
14. Determination of saponification value of oils.
15. Determination of pour and cloud points of lubricating oil.
16. Determination of Acid value of oil.Demo:
17. Biodiesel from used cooking oil.
18. Construction of electrochemical cells.
19. Synthesis of semiconductors.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1208** | |
| **Course Title: APPLIED 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 real time 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: COMMUNICATION SKILLS LAB (B19HS1202)

(Common to CE, ECE, EEE & ME)

**UNIT-I:** JAM, Common Errors Neutralizing accent

**UNIT-II:** Telephonic Etiquette,Role Plays, Poster Presentations

**UNIT-III:** Presentation SkillsPublic Speaking Data Interpretation

**UNIT-IV:** Group Discussion Do's and Don'ts

**UNIT-V:** Curriculum Vitae Covering Letter Interview Skills Mock Interviews, FAQ's.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS1202** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

## SYLLABUS: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (B19CS1204)

(Common to CE, EEE & ME)

1. Exercise 1:
   1. Write a C program to print a block F using hash (#), where the F has a height of six charactersand width of five and four characters.
   2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches andwidth of 5 inches.
   3. Write a C program to display multiple variables.
2. Exercise 2:
   1. Write a C program to calculate the distance between the two points.
   2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and pis even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sumof p and q print "Correct values", otherwise print "Wrong values".
3. Exercise 3:
   1. Write a C program to convert a string to a long integer.
   2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
   3. Write a C program to calculate the factorial of a given number.
4. Exercise 4:
   1. Write a program in C to display the n terms of even natural number and their sum.
   2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
   3. Write a C program to check whether a given number is an Armstrong number or not.
5. Exercise 5:
   1. Write a program in C to print all unique elements in an array.
   2. Write a program in C to separate odd and even integers in separate arrays.
   3. Write a program in C to sort elements of array in ascending order.
6. Exercise 6:
   1. Write a program in C for multiplication of two square Matrices.
   2. Write a program in C to find transpose of a given matrix.
7. Exercise 7:
   1. Write a program in C to search an element in a row wise and column wise sorted matrix.
   2. Write a program in C to print individual characters of string in reverse order.
8. Exercise 8:
   1. Write a program in C to compare two strings without using string library functions.

2. Write a program in C to copy one string to another string.

9. Exercise 9:
   1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
   2. Write a program in C to demonstrate how to handle the pointers in the program.
10. Exercise 10:
    1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
    2. Write a program in C to add two numbers using pointers
11. Exercise 11:
    1. Write a program in C to add numbers using call by reference.
    2. Write a program in C to find the largest element using Dynamic Memory Allocation
12. Exercise 12:
    1. Write a program in C to swap elements using call by reference.
    2. Write a program in C to count the number of vowels and consonants in a string using a pointer.
13. Exercise 13:
    1. Write a program in C to show how a function returning pointer.
    2. Write a C program to find sum of n elements entered by user. To perform this program, allocatememory dynamically using malloc( ) function
14. Exercise 14:
    1. 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 program.
    2. Write a program in C to convert decimal number to binary number using the function.
15. Exercise 15:
    1. Write a program in C to check whether a number is a prime number or not using the function.
    2. Write a program in C to get the largest element of an array using the function.
16. Exercise 16:
    1. Write a program in C to append multiple lines at the end of a text file.
    2. Write a program in C to copy a file in another name.
    3. Write a program in C to remove a file from the disk.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1204** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able design and development of C problem solving skills . |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program. |

## SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19EE1205)

(Electrical & Electronics Engineering)

**Apply Design Thinking on the following Streams to**

**Project Stream 1**: Electronics, Robotics, IOT and Sensors

**Project Stream 2**: Computer Science and IT Applications

**Project Stream 3**: Mechanical and Electrical tools

**Project Stream4**: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources,Agriculture, Environmental science and other fields of engineering.

## ELECTRICAL AND ELECTRONICS ENGINEERING

## SYLLABUS: ELECTRONIC DEVICES AND CIRCUITS (B19EC2101)

(Common to ECE & EEE)

**UNIT-I : Semiconductor diode and its applications:** Potential variation in graded semiconductors. Open circuited PN junction, 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, characteristics of Tunnel diode and Zener diode. Half wave, Full wave and Bridge Rectifiers with and without filters, Ripple factor and regulation characteristics.

**UNIT-II : Bipolar junction transistors:** Operation of a transistor and transistor biasing for different operating conditions, transistor current components, transistor amplification factors: $\alpha,\beta,\gamma$ relation between $\alpha$ and $\beta,\gamma$ 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.

**UNIT-III: Transistor Biasing Circuits:** The operating point, Bias stability, different types of biasing techniques, stabilization gainst variation in $I_{co}$ , $V_{BE,}$ & $\beta$. 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: B19EC2101** | |
| **Course Title: ELECTRONIC DEVICES AND CIRCUITS** | |
| **CO-1** | Analyze the characteristics and operation of Diode, BJT, JFET and MOSFET. |
| **CO-2** | Analyze the biasing circuits of BJT and JFET. |
| **CO-3** | Analyze the performance of small signal BJT and FET single stage amplifiers. |
| **CO-4** | Apply the gained knowledge in the design of simple Electronic circuits. |

# SYLLABUS: MATHEMATICS IV (B19BS2102)

**(**Complex Variables & Statistical Methods**)**
(Common to CE & EEE)

**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 on the review portion).** Limit and continuity of a function of a complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, determine an analytic function based onthe knowledge of its real and imaginary parts, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: thetransformations defined by w = z+c, w = cz, w = 1/z. The Bilinear transformation.

**UNIT-II: Complex Integration:** Line integral, Cauchy"s integral theorem, Cauchy"s integral formula. Expansion of a function in a Taylor series, McLaren series and Laurent series. Types of singularities, Residues, Cauchy"s residue theorem. Evaluation of real definite integrals –integration around unit circle (Theorems without proofs).

**UNIT-III: Difference equations and Z-transforms :** Formation of a difference equation, Rules for finding complimentary function and particularintegral 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 :** A brief review of random variables, Binomial, Poisson and Normal distributions, definitionsof pmf/ pdf, notation, mean, variance, moment generating function. Fitting of Binomial or Poisson distributions for a given frequency distribution.

**UNIT-V: Sampling theory and Testing of Hypothesis: Sampling theory:** Introduction, population and samples, Sampling distribution, standard error, central limit theorem (without proof), level of significance, procedure of testing of hypothesis.
**Large samples:** Testing of hypothesis for single proportion and two proportions.
**Small samples:** Degrees of freedom, Students" t- distribution, t-test for single mean, two means; Chi- squared distribution, test for goodness of a fit.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19BS2102** | |
| **Course Title: MATHEMATICS IV** | |
| **CO-1** | Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics |
| **CO-2** | Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals. |
| **CO-3** | Formulate and solve linear difference equations. |
| **CO-4** | Use Z-transforms to solve linear difference equations with constant coefficients. |
| **CO-5** | Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution. |
| **CO-6** | Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples. |

## SYLLABUS: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION (B19EE2101)

**UNIT-I: Measuring Instruments:** Classification, Error Analysis, Deflecting, Controlling and Damping torques, Moving Coil, Moving iron type instruments, Expression for the torque, Errors, and compensations. Extension of range using shunts and Multipliers, Introduction to CT & PT, Errors and compensation, Applications, comparison between C.T. and P.T.

**UNIT-II: Measurement of Power and Energy:** Dynamometer type wattmeter – Torque expression, Errors. Energy meters, Calibration of energy meters. Measurement of power using Instrument Transformers, Power factor meter.

**UNIT-III: AC & DC Bridges:** Methods of Measuring Low, Medium, and High Resistance, Kelvin"s Double Bridge, Wheat Stone"s Bridge, Loss of Charge Method, Methods of Measuring Inductance, Capacitance, and Frequency-Maxwell"s Bridges, Anderson"s Bridge, Hay"s Bridge, Owen"s Bridge, Schering Bridge, Wein"s Bridge.

**UNIT-IV: Measurement of Non-Electrical Quantities:** Transducers – Classifications, Principle of operation of Resistance, Inductive and capacitive Transducers, LVDT, Strain Gauge, and Piezo-Electric Transducers. Measurement of Pressure and Displacement, Measurement of Temperature -Thermocouple.

**UNIT-V: Digital Measurement and CRO:** Digital Voltmeter –Dual Slope Type, Successive Approximation Type. CRO- Calibration, Measurement of Different Quantities, Lissajous Patterns. ADC- Flash Type, DAC- R2R ladder, Weighted Resistor Type.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EE2101** | |
| **Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION** | |
| **CO-1** | Examine the operation of different meters for measuring electrical quantities with their applications. |
| **CO-2** | Apply the knowledge of instrument transformers to use them for accurate measurements. |
| **CO-3** | Analyse the usage of different bridges for the measurement of Resistance, Capacitance, Inductance and Frequency. |
| **CO-4** | Examine the operation of different transducers for measuring non-electrical quantities with their applications. |
| **CO-5** | Interpret the usage of CRO, ADC, DAC & Digital Voltmeters. |

## SYLLABUS: NETWORK ANALYSIS AND SYNTHESIS (B19EE2102)

**UNIT-I: THREE-PHASE CIRCUITS**: Advantages of Three Phase Circuits, Relation between Line and Phase Quantities in Star and delta connected circuits, Analysis of Balanced & Unbalanced Three Phase Circuits, Three-Phase Power Measurements (2-Wattmeter method)

**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, sinusoidal andother signal waveforms, Initial and Final Value Theorem.

**UNIT-IV: Network Functions & Two Port Network Parameters:** Network functions, Concept of Poles and Zeroes, Restriction of Poles and Zeroes forDriving point and transfer function.
Two port network parameters – Z, Y, ABCD and Hybrid parameters and Interrelationship between different parameters, and Interconnections of various networks.

**UNIT-V: Network Synthesis**: Hurwitz Polynomial. Positive real function - basic synthesis procedure - Foster and Cauerforms of LC, RC and RL networks.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EE2102** | |
| **Course Title: NETWORK ANALYSIS AND SYNTHESIS** | |
| **CO-1** | Explain three-phase balanced and unbalanced electric circuits. |
| **CO-2** | Analyze the transient behavior of circuits by applying first and second order differential equations. |
| **CO-3** | Apply Laplace transform techniques to electrical circuits. |
| **CO-4** | Analyze and model two port network based on its parameters. |
| **CO-5** | Synthesize an electrical network from a given impedance/admittance function. |

## SYLLABUS: ELECTRO MAGNETIC FIELD THEORY (B19EE2103)

**UNIT-I: Electrostatics:** Rectangular, cylindrical and spherical coordinate systems, 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, Energy & Dielectrics:** Electric potential, calculation of electric potential for given 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 for single variables, uniqueness theorem, electric dipoles, polarization of dielectrics.

**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 circuits law in integral and differential form, applications of Ampere"s law, Stokes theorem

**UNIT-IV: Magnetic Potential & Energy:** Calculation of scalar and vector magnetic potential, magnetostatics boundary conditions. The magnetic dipole, magnetization, bound current, inductance and energy in magnetic fields, Lorentz force equation.

**UNIT-V: Time varying fields & Electromagnetic waves:** Faraday"s laws, Lenz"s law, 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, skin depth, the pointing vector, poynting theorem and power considerations.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EE2103** | |
| **Course Title: ELECTRO MAGNETIC FIELD THEORY** | |
| **CO-1** | **Apply** vector calculus to findthe electrostatic and magneto static fields for given charge/ current configurations. |
| **CO-2** | **Apply** basic principles/ theorems/ laws to estimate the effect of electric and magnetic fields. |
| **CO-3** | **Analyze** theboundary conditions, calculate parameters like energy, Inductance, Capacitance, forces |
| **CO-4** | **Analyze** theMaxwell"s equations for both static and time varying fields. |
| **CO-5** | **Analyze** the EM wave in different domains and compute average power density |

## SYLLABUS: DATA STRUCTURES (B19CS2108)

(Common to ECE & EEE)

**UNIT-I: Linear Data Structures: Arrays, Stacks and Queues:** Data Structures -Operations-Abstract Data Types-Complexity of Algorithms-Time and Space Arrays-Representation of Arrays-Linear Arrays-Insertion–Deletion and Traversal of a Linear Array-Array as an Abstract Data Type-Multi-Dimensional arrays-Strings-String Operations Storing Strings-String as an Abstract Data Type

Stack -Array Representation of Stack-Stack Abstract Data Type-Applications of Stacks: PrefixInfix and Postfix Arithmetic Expressions-Conversion-Evaluation of Postfix Expressions Recursion-Towers of Hanoi-Queues-Definition-Array Representation of Queue- The Queue Abstract Data Type-Circular Queues-Dequeues-Priority Queues.

**UNIT-II: Linked Lists:** Pointers-Pointer Arrays-Linked Lists-Node Representation-Single Linked List-Traversing and Searching a Single Linked List-Insertion into and Deletion from a Single Linked List-

Header Linked Lists-Circularly Linked Lists-Doubly Linked Lists-Linked Stacks and Queues Polynomials-Polynomial Representation-Sparse Matrices.

**UNIT-III: Trees:** Terminology-Representation of Trees-Binary Trees-Properties of Binary Trees-Binary Tree Representations-Binary Tree Traversal-Preorder-Inorder and Postorder Traversal- Threads Thread Binary Trees-Balanced Binary Trees-Heaps-Max Heap-Insertion into and Deletion from a Max Heap-Binary Search Trees-Searching-Insertion and Deletion from a Binary Search Tree Height of Binary Search Tree, m-way Search Trees, B-Trees.

**UNIT-IV: Graphs:** Graph Theory Terminology-Graph Representation-Graph Operations-Depth First Search-Breadth First Search-Connected Components-Spanning Trees-Biconnected Components- Minimum Cost Spanning Trees-Kruskal‟s Algorithm-Prism‟s Algorithm-Shortest Paths- Transitive Closure-AllPairs Shortest Path-Warshall‟s Algorithm

**UNIT-V: Searching And Sorting**: Searching -Linear Search-Binary Search-Fibonacci Search-Hashing-Sorting-Definition- BubbleSort-Insertion sort-Selection Sort-Quick Sort-Merging-Merge Sort-Iterative and Recursive Merge Sort-Shell Sort-Radix Sort-Heap Sort.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19CS2108** | |
| **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**& perform operations on dynamic linear data structures like linked lists. |
| **CO-3** | **Apply** different operations on trees and graphs. |
| **CO-4** | **Implement**& analyze various searching &sorting algorithms |

## SYLLABUS: NETWORKS LAB (B19EE2104)

### LIST OF EXPERIMENTS:

1. Kirchhoff"s Laws.
2. Verification of Ohms Law and Resistance of a filament Lamp.
3. Maximum Power Transfer Theorem.
4. Superposition Theorem.
5. Thevenin"s Theorem.
6. Verification of Norton"s Theorem
7. Two Port Network Parameters.
8. Series Resonance.
9. Parameters of choke coil.
10. Measurement of power using 2-wattmeter method
11. Locus Diagrams of RL and RC SeriesCircuits

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19EE2104** | |
| **Course Title: NETWORKS LAB** | |
| **CO-1** | Inspect Maximum power transfer, superposition, Thevinins & Nortons Theorems |
| **CO-2** | Analyze resonance condition in R-L-C series circuit and draw locus diagrams for RL,RC series circuits. |
| **CO-3** | Examine power in 3- phase circuits in 3-phase balanced load. |
| **CO-4** | Verify the Ohm"s law, Kirchhoff"s current"s law, Kirchhoff"s voltage"s law. |
| **CO-5** | Evaluate Two port network parameters and parameters of choke coil |

# SYLLABUS: ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION) (B19EC2105)

(Common to ECE & EEE)

## LIST OF EXPERIMENTS:

1. Study and Analyze V-I Characteristics of Semiconductor Diode (Ge & Si), LED and Zener Diode.
2. Determination of Ripple Factor and Regulation Characteristics of Half Wave and Full Wave
3. Rectifier With and Without Filter.
4. Study and Analyze The Characteristics of BJT in CE Configuration and determination of h- parameters.
5. Study and Analyze The JFET Characteristics.
6. Design of Biasing Circuits for BJT and FET.
7. Design of simple amplifier circuits using BJT.
8. Design of electronic circuits using FET.

## 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 Characteristics of Tunnel Diode.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: (B19EC2105)** | |
| **Course Title: ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION)** | |
| **CO-1** | Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters. |
| **CO-2** | Analyze the performance of rectifier circuits with and without filters. |
| **CO-3** | Analyze the performance of BJT and FET amplifier circuits. |
| **CO-4** | Simulation and Design of small electronic circuits using BJT and FET. |

## ELECTRICAL & ELECTRONICS ENGINEERING

## SYLLABUS: ELECTRICAL MACHINES-I (B19EE2201)

**UNIT-I: Electromechanical energy conversion:** Basic principles of energy, force and torque in singly and multiply excited systems.Construction and working principle of DC machines and methods of excitation.

**UNIT-II: D.C. Machines:** D.C generators-emf equation, armature reaction, commutation. Compensating winding,characteristics of various types of generators, applications. D.C. motors- torque equation, D.C. shunt, series and compound motors– characteristics & applications

**UNIT-III: 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.

**UNIT-IV: Transformers:** Principle, construction and operation of single-phase transformers, phasor diagram, equivalent circuit, voltage regulation, losses and efficiency. Testing- open & short circuittests, Sumpner"s test. Autotransformers- construction, principle, applications and comparison with two windingtransformer.

**UNIT-V: Three phase transformers:** Construction, various types of connection and their comparative features. Parallel operation of single phase and three phase transformers. Three phase transformer connections. Scott connection, Cooling methods of transformers.

| Course Outcomes for Second Year Second Semester Course | |
|---|---|
| **Course Code: B19EE2201** | |
| **Course Title: ELECTRICAL MACHINES-I** | |
| **CO-1** | Identify the concepts of electromechanical energy conversion. Describe the concepts of construction, operating principle of DC machines. |
| **CO-2** | Discriminate different types of DC machines and transformers, efficiency on DC machine and parallel operation of DC generators and transformers. |
| **CO-3** | Interpret the characteristics of DC machines |
| **CO-4** | Discriminate different types of speed control methods of DC motors and different types of transformer connections |
| **CO-5** | Examine the performance of DC machines and transformers by different testing methods. |

## SYLLABUS: DIGITAL ELECTRONICS AND LOGIC DESGIN (B19EE2202)

**UNIT-I: NUMBERING SYSTEMS, CODES AND BOOLEAN ALGEBRA:** Number Systems, Base Conversion Methods, Complements of Numbers, Binary arithmetic,Signed Binary numbers, Binary Codes-BCD, Excess-3, 2421, 8421 codes. Even and Odd parity, Gray code, Hamming code, Error detecting and Error correcting codes.Fundamentalsof Boolean algebra, Basic theorem and Properties, Simplification of Boolean functions using Boolean theorems.

**UNIT-II: LOGIC GATES AND GATE-LEVEL MINIMIZATION:** Fundamentals of Logic Gates – AND, OR, NOT, NAND, NOR and XOR and its truth tables. SOP & POS Simplifications for Boolean expression, Canonical and Standard Forms,Karnaugh map (K-map) with maximum of 4 variables, Don"t Care Conditions. Function Implementation using AND-OR logic, NAND and NOR Logic diagram.

**UNIT-III: COMBINATIONAL LOGIC CIRCUITS AND DESIGN:** Logic Design of Combinational circuits – Binary Additions, Subtractions, Multiplexers,Demultiplexers, Decoders, Encoders, Code Conversion, 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. Operations of Shift Registers and universal shift register. Digital Counters-Ripple Counter design, Synchronous Counter design with T, D and J.K. Flip-flops.

**UNIT-V: REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS:** AND, OR and NOT Gates using Diodes and Transistors, RTL, DTL, TTL and CML LogicFamilies and its comparison.

| **Course Outcomes for Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19EE2202** | |
| **Course Title: DIGITAL ELECTRONICS AND LOGIC DESGIN** | |
| **CO-1** | Apply the concepts of Boolean Algebra for the analysis and minimization of Boolean expressions and apply the knowledge of number systems to performarithmetic operations and error corrections. |
| **CO-2** | Deduce the Boolean expressions by K-maps and implement logic circuits using logic gates. |
| **CO-3** | Design and analyze the combinational logic circuits. |
| **CO-4** | Design and analyze the sequential logic circuits. |
| **CO-5** | Design and analyze the logic gates using diodes and transistors. |

## SYLLABUS: SIGNALS AND SYSTEMS (B19EE2203)

**UNIT-I: Introduction to Continuous –Time and Discrete –Time signals and systems:** Basic continuous time and discrete time signals, Signal Energy and Power, Transformations of the independent variable, Periodic Signals, Even and odd Signals, Complex Exponential signals, The Unit Impulse and Unit step Functions, Classification of systems, Basic system properties.

**UNIT-II: Linear Time – Invariant (LTI) Systems:** Representation of signals in terms of impulses, Convolution sum and Convolution integral. Systems described by differential and difference equations. Block diagram representation ofLTI systems, Singularity functions.
Analogy between vectors and signals, Approximation of a function by a set of mutually orthogonal functions.

**UNIT-III: Fourier Series Representation of Periodic Signals:** Response of LTI systems to Complex Exponentials – the Continuous time and Discrete time Fourier series, Trigonometric and Exponential Fourier series, Convergence of Fourier series, Properties of Fourier Series

**UNIT-IV: Continuous and Discrete time 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: Sampling and Z-transform:** Representation of a CT signal by its samples, The Sampling theorem, Reconstruction of a signal from its samples, Effect of Under sampling, Discrete time processing of continuous time signals.
The Z-transform, Region of Convergence, relation between Z-transform and Fourier transform, Properties of z-transform, Inverse z-transform, determination of transfer function and impulse response of an LTI system, poles and zeros, system stability.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19EE2203** | |
| **Course Title: SIGNALS AND SYSTEMS** | |
| **CO-1** | **Apply** the properties of continuous time and discrete time signals and systems to classify them. |
| **CO-2** | **Apply** convolution to analyze CT and DT systems in the Time domain. |
| **CO-3** | **Analyze** the spectral characteristics of periodic and aperiodic signal using Fourier analysis. |
| **CO-4** | **Apply** sampling theorem for signal conversion. |
| **CO-5** | **Analyze** DT signals and systems using Z Transform. |

## SYLLABUS: PRIME MOVERS AND PUMPS (B19ME2207)

**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: Generation of steam**: Dryness fraction and properties of steam, function of boilers, working principle of Lancashire boiler, Babcock and Wilcox boiler, boiler mounting and accessories. Steam engines: Rankine and Modified Rankine cycle for steam engines.

**UNIT-III: Steam turbines**: Classification of steam turbines, compounding of steam turbines, pressure compounding, velocity compounding, and pressure-velocity compounding.
Gas turbine: Classification of gas turbine-constant pressure combustion cycle, closed cycle and constant volume combustion gas turbine plants.

**UNIT-IV: Fluid Mechanics**: Newtonian and Non-Newtonian Fluids, viscosity, types of fluid flows, continuity, momentum and energy equations, Bernoulli"s equation and its applications, laminar and turbulent flows, Reynolds number and its significance.
Pumps: Types of pumps, Centrifugal pumps: Main components, Working principle, multistage pumps, Performance and characteristic curve.

**UNIT-V: Hydraulic Turbines**: Classification of turbines; Working rinciple, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME2207** | |
| **Course Title: PRIME MOVERS AND PUMPS** | |
| **CO-1** | **Compute** the performance parameters of Internal combustion engines |
| **CO-2** | **Compute** the efficiencies of steam & gas power plants to improve their performance. |
| **CO-3** | **Apply** the concepts of mechanics to solve the hydrodynamic force of jets. |
| **CO-4** | **Apply** the concepts of fluid mechanics to solve the performance parameters of turbines and pumps |

# SYLLABUS: OOPS THROUGH JAVA (B19CS2209)

(Common to ECE & EEE)

**UNIT-I: INTRODUCTION TO JAVA:** 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: OBJECTS AND CLASSES:** Classes and objects, class declaration, creating objects, methods, constructors andconstructor overloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.

**UNIT-III: INHERITANCE:** Inheritance, types of inheritance, super keyword, final keyword, overriding and abstractclass.
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 to files, random access file.

**UNIT-V: APPLETS AND AWT CLASSES:** 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 First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS2209** | |
| **Course Title: OOPS THROUGH JAVA** | |
| **CO-1** | **Apply** object-oriented programming principles and various java programming constructs and develop java programs. |
| **CO-2** | **Apply** the concepts of Inheritance, Polymorphism and String handling methods in developing java programs |
| **CO-3** | **Apply** the concepts like interfaces, packages, exception handling and multithreading in programming to develop error free programs. |
| **CO-4** | **Develop** the GUI applications for the end users using applets with event handling. |

## SYLLABUS: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR (B19HS2201)

(Common to ECE &EEE)

**UNIT-I: Introduction to Management: Management:** Concept, Nature and importance of Management, Functions of management,Evolution of Management thought, Taylor"s Scientific Management, Fayol"s principles of Management, Social Responsibility of Business.

**UNIT-II: Functional Management: Human Resource Management (HRM)**: Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Compensation & Performance Appraisal.
**Marketing Management:** Concept, Functions of marketing; Marketing Mix - Product,
Price, Place & Promotion; Marketing strategies based on Product life cycle, Channels of distribution.

**UNIT-III: Strategic Management:** Vision, Mission, Goal, Objective, Policy, Strategy. Elements of Corporate planning process; Environmental scanning; SWOT analysis; steps in Strategy formulation, implementation, evaluation & control; Bench Marking; Balanced Score Card.

**UNIT-IV: Organizational Behavior:** Individual Behavior: Perception-Perceptual process; Attitude-Attitutidinal change, Organizational Change, Factors Influencing Change, Types of Change. **Motivation**: Meaning, Theories of Motivation - Maslow"s Theory of Human Needs,Douglas McGregor"s Theory X and Theory Y, Herzberg"s Two-Factor Theory ofMotivation.

**UNIT-V: Group Dynamics:** Types of Groups, Stages of Group development; **Organizational conflicts** - Reasons for Conflicts, Consequences of Conflicts in Organization, Types of Conflicts, Strategies for Managing Conflicts, Stress - Causes and effects, coping strategies of stress.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19HS2201** | |
| **Course Title: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR** | |
| **CO-1** | Explain management functions and principles |
| **CO-2** | Will be able to describe the concepts of functional management that is HRMand Marketing functions |
| **CO-3** | Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends |
| **CO-4** | The learner is able to recognise strategically contemporary management practicesand describe corporate planning process |
| **CO-5** | The learner can discuss about individual behaviour and motivational theories |
| **CO-6** | The student can explain about ways in managing conflicts and stress |

## SYLLABUS: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB (B19EE2204)

### LIST OF EXPERIMENTS.

1. Measurement of Parameters of Iron Core Inductor.
2. Measurement of Power By 3-Voltmeter Method.
3. Measurement of Power Using 3-Ammeter Method.
4. Measurement of Low Resistance using Kelvin Double bridge.
5. Measurement of Inductance using Anderson bridge.
6. Measurement of Inductance using Maxwell bridge.
7. Measurement of Capacitance using Schering bridge.
8. Calibration of Single-Phase Wattmeter.
9. Calibration of Single-Phase Energy Meter using Phantom Loading.
10. Measurement of Power using Two Wattmeter Method.
11. Measurement of Power using Three Wattmeter Method.
12. Testing of Dielectric Strength of Oil.
13. Study of LVDT and Capacitance Pickup-Characteristics and Calibration.
14. Resistance Strain Gauge-Strain Measurement and Calibration.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EE2204** | |
| **Course Title: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB** | |
| **CO-1** | **Calibrate** Wattmeter and Energy Meter. |
| **CO-2** | **Select** the suitable method for measurement of active, reactive powers and energy. |
| **CO-3** | **Apply** various transducers used for the measurement of various physical quantities. |
| **CO-4** | **Apply** the suitable method for measurement of resistance, inductance, and capacitance. |
| **CO-5** | **Test** the dielectric strength of oil |

## SYLLABUS: THERMAL PRIME MOVERS LAB (B19ME2208)

### LIST OF EXPERIMENTS

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 First Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2208** | |
| **Course Title: THERMAL PRIME MOVERS LAB** | |
| **CO-1** | Assess the environmental, societal safety and health issue through determining the flash & fire point of various lubricating oils as well as fuels, engine performance characteristics, along with computing the viscosity of lubricating oils. |
| **CO-2** | Functioning and communicating as an individual in a team to write and prepare effective reports on experiments conducted in the laboratory. |

## SYLLABUS: PROFESSIONAL ETHICS AND HUMAN VALUES (B19MC2202)

(Common to CE & EEE)

**UNIT-I: Human Values:** Morals, Values and Ethics-Integrity-Work Ethic-Service learning Civic Virtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence Character Spirituality.

**UNIT-II: Engineering Ethics:** Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmasMoral autonomy- Kohlberg's theory- Gilligan's theory-Consensus and controversy Models of professional roles-Theories about right action-Self-interest -Customs and religion Uses of Ethical theories Valuing time Cooperation Commitment.

**UNIT-III: Engineering as Social Experimentation:** Engineering As Social Experimentation- Framing the problem- Determining the facts codes of Ethics- Clarifying Concepts- Application issues Common Ground - General Principles- Utilitarian thinking respect for persons.

**UNIT-IV: Engineers Responsibility for Safety and Risk:** Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety- Intellectual Property rights(IPR).

**UNIT-V: Global Issues:** Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers- Computer codes of Ethics- Weapons
Development -Ethics and Research Analyzing Ethical Problems in research.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19MC2202** | |
| **Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES** | |
| **CO-1** | Identify and analyze an ethical issue in the subject matter under investigation or ina relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work. |
| **CO-2** | Identifythemultipleethicalinterestsatstakeinareal-worldsituationorpractice and Articulate what makes a particular course of action ethically defensible. |
| **CO-3** | Assess their own ethical values and the social context of problems. |
| **CO-4** | Identify ethical concerns in research and intellectual contexts, including academicintegrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects. |
| **CO-5** | Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research. |

# INFORMATION TECHNOLOGY

## INFORMATION TECHNOLOGY

**SYLLABUS: ENGLISH (B19HS1101)**

(Common to CE, CSE, EEE, IT & ME)

**UNIT-I:** Lesson: A Drawer full of happiness from *Infotech English*, Maruthi Publications.

Listening: Listening to short audio texts and identifying the topic, context and specificpieces of information to answer a series of questions both in speaking and writing.

Speaking: Self- introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

Grammar: Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

Pronunciation: Vowels, consonants, plural markers and their realizations

**UNIT-II:** Lesson-: Nehru's letter to his daughter, Indira on her birthday from *Infotech English*, Maruthi Publications.

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

Grammar: Articles, prepositions and use of antonyms.

Pronunciation: Past tense markers, word stress-di-syllabic words.

**UNIT-III:** Lesson: Stephen Hawking-Positivity' Benchmark' from *Infotech English*, Maruthi Publications.

Listening: Listening for global comprehension and summarizing what is listened to both in speaking and writing.

2

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: complaining and apologizing.

Reading: Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

Reading for Writing: Letter writing- types, format and principles of letterwriting, E-mail etiquette, writing a Resume/CV and covering letter.

Vocabulary: Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, wordapplications, sequencing of words.

Grammar: Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).

Pronunciation: Word stress-poly-syllabic words.

**UNIT-IV:** Lesson: Liking a Tree, Unbowed: Wangari Maathai biography from *Infotech English*, Maruthi Publications.

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.

Grammar: Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.

Pronunciation: Contrastive Stress.

**UNIT-V:** Lesson: Stay Hungry–Stay Foolish from *Infotech English*, Maruthi Publications.

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts–with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.

3

Reading for Writing: Report writing, writing academic proposals- writing research articles: format and style.

Vocabulary: Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

Grammar: Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).

Pronunciation: Stress in compound words.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1101** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Understand and apply the principles of writing to paragraphs, arguments, essays and formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

## SYLLABUS: MATHEMATICS-I (B19BS1101)
## (LINEAR ALGEBRA, DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS)
(**Common to All Branches**)

**UNIT-I: Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II: Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS – I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve linear ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits. |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform and inverse Laplace transform and solve linear ODE. |

## SYLLABUS: MATHEMATICS – II (B19 BS1102)
## (NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)
(Common to CSE, ECE & IT)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation,Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton-Raphson method.
Trapezoidal rule, Simpson's 1/3$^{rd}$ rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth order Runge-Kutta method..

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.
Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method.Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation. Solutions of Linear homogeneous and non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the D'Alembert'ssolution, one- dimensional heat equation

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19 BS 1102** | |
| **Course Title: MATHEMATICS – II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numericallycertain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation |

## SYLLABUS: APPLIED CHEMISTRY (B19BS1105)

(Common to CSE,ECE & IT)

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:** Polymerization Definition, Types of Polymerization, free radical 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: Energy Sources and Applications: Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications of radicative materials Solar Photovoltaic cell- Thermal fuels – Introduction – Classification – Calorific value – HCV and LCV – Bomb calorimeter; Coal : Proximate and ultimate analysis of coal – Significance of the analysis – Manufacture of coke by Otto Hoffman's by Product Process , Refining crude oil; Knocking; Chemical structure Knocking, Octane number of glassline, Cetane number of diesel oil, synthetic Petrol; LPG,CNG

**UNIT-III: Electrochemical cells and Corrosion:** Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen fuel 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. Indian standards and WHO standards of drinking water. Design of drinking water plant.

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 chemistryof 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: B19BS1105** | |
| **Course Title: APPLIED CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C (B19CS1101)

(Common to CSE & IT)

**UNIT-I:** Introduction to Fundamentals of Computer Science & Visual Programming through Scratch and App Inventor, Flowchart design through Raptor: History of digital computers, types of computers, Computer Programming- Machine Language, Assembly language and high-level and low level languages, Assemblers, Compilers, and Interpreters, Types of memory.

Visual Programming through Scratch and App Inventor: Introduction to programming concepts with scratch, Scratch environment, sprites looks and motion, Angles and directions, repetition and variation, changing costumes, adding background, Input /Output, variables and operators. Working with sounds and sprite communication and creating stories, App Generation.

Flowchart design through Raptor: Algorithm development, Flowcharts, Looping, some programming features, Pseudo code, some structured programming concepts, documents.

**UNIT-II:** Introduction to 'C' language: Structure of C program, A Simple C program, identifiers, basic data types and sizes,Constants, variables, Operators, expressions, type conversions, conditional expressions,precedence and order of evaluation. Input-output statements, statements and blocks, Conditional Statements and Loops.

**UNIT-III:** Functions and arrays: Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs. Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays.

**UNIT-IV**: Pointers and Structures: pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

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, Single Linked list, typedef, bit fields.

**UNIT-V:** Files: Input and output - concept of a file, text files and binary files, streams, standard I/o,Formatted I/o, file I/o operations, error handling, C program examples.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19CS1101** | |
| **Course Title: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C** | |
| **CO-1** | The student will be able to develop Flow charts and write algorithms. |
| **CO-2** | The student will be able to develop efficient algorithms for solving a problemusing the constructs of a programming language like conditional, iteration and recursion. |
| **CO-3** | The student will able write programs using functions and arrays |
| **CO-4** | The student will able write programs using Pointers and Structures |
| **CO-5** | The student will able write programs for Files |

## SYLLABUS: APPLIED CHEMISTRY LAB (B19BS1108)

(Common to CSE, ECE & IT)

### LIST OF EXPERIMENTS

1. Introduction of Chemistry Laboratory.
2. Estimation of HCL using standard Sodium Hydroxide.
3. Determination of total hardness of water by EDTA method.
4. Estimation of Ferrous Iron by KMnO4.
5. Estimation of oxalic acid by KMnO4.
6. Estimation of Mohr's salt by K2Cr2O7.
7. Estimation of Dissolved oxygen by Winkler's method.
8. Determination of pH by pH meter and universal indicator method.
9. Conductometric titration of strong acid Vs strong base.
10. Conductometric titration of strong acid Vs weak base.
11. Potentionmetric titration of strong acid Vs strong base.
12. Potentionmetric titration of strong acid Vs weak base.
13. Preparation of Phenol formaldehyde resion.
14. Determination of saponification value of oils.
15. Determination of pour and cloud points of lubricating oil.
16. Determination of Acid value of oil.

**Demo:**

1. Biodiesel from used cooking oil.
2. Construction of electrochemical cells.
3. Synthesis of semiconductors.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19BS1108** | |
| **Course Title: APPLIED 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 real time 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 LAB (B19HS1102)
(Common to All Branches)

**UNIT-I:** Pronunciation
Letters and Sounds
The Sounds of English
Phonetic Transcription

**UNIT-II:** Past tense markers
Word stress-di-syllabic words
Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms
Stress in compound words

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C LAB (B19CS1104)

(Common to CSE & IT)

Exercise 1:

Visual Programming through Scratch: Sprites looks and motion, Angles and directions, repetition and variation

Flowchart design through Raptor: Finding maximum of 3 numbers, Interest calculators, multiplication tables, GCD of 2 numbers, prime number generation.

Exercise 2:

Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.

Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.

Write a C program to display multiple variables.

Write a C program to calculate the distance between the two points.

Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

Write a C program to convert a string to a long integer.

Write a program in C which is a Menu-Driven Program to compute the area of the variousgeometrical shape.

Write a C program to calculate the factorial of a given number.

Write a program in C to display the n terms of even natural number and their sum.

Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.

Exercise 4:

Write a C program to check whether a given number is an Armstrong number or not.

Write a program in C to print all unique elements in an array.

Write a program in C to separate odd and even integers in separate arrays.

Write a program in C to sort elements of array in ascending order.

Exercise 5:

Write a program in C for multiplication of two square Matrices.

Write a program in C to find transpose of a given matrix.

Write a program in C to search an element in a row wise and column wise sorted matrix.

Write a program in C to print individual characters of string in reverse order.

Exercise 6:

Write a program in C to compare two strings without using string library functions.

Write a program in C to copy one string to another string.

Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 7:

Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.

Write a program in C to add two numbers using pointers.

Write a program in C to add numbers using call by reference.

Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 8:

Write a program in C to swap elements using call by reference.

Write a program in C to count the number of vowels and consonants in a string using a pointer.

Write a program in C to show how a function returning pointer.

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

Exercise 9:

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

Write a program in C to convert decimal number to binary number using the function.

Write a program in C to check whether a number is a prime number or not using the function.

Write a program in C to get the largest element of an array using the function.

Exercise 10:

Write a program in C to append multiple lines at the end of a text file.

Write a program in C to copy a file in another name.

Write a program in C to remove a file from the disk.

Write a program for CapsLock on/off, NumLock On/off, ScrollLock on/off, restart the system

Exercise 11: **Assembling& Disassembling, OS Installation**

System Assembling, Disassembling and identification of Parts / Peripherals.

Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.

Exercise 12: **MS-Office / Open Office**

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

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

PowerPoint - features of power point, guidelines for preparing an effective presentation.

**Note:**

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: B19CS1104** | |
| **Course Title: COMPUTER FUNDAMENTALS & PROBLEM SOLVING USING C LAB (B19CS1104)** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able to design and develop of C problem solving skills. |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program |
| **CO-6** | Able to Identify various computer components, Installation of software |

## INFORMATION TECHNOLOGY

**SYLLABUS: MATHEMATICS – III (B19BS1202)**

(Multivariable Calculus and Fourier analysis)

(Common to CE, CSE, ECE, EEE & IT)

**UNIT-I: 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.

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

**UNIT-III: Single and Multiple integrals:** Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.

Double and triple integrals, change of variables, Change of order of integration.Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation:** Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, 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) andrelated Problems.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1202** | |
| **Course Title: MATHEMATICS–III** | |
| **CO-1** | Determine Fourier series and half range series of functions. |
| **CO-2** | Find different Fourier transforms of non-periodic functions and also use them to evaluate integrals. |
| **CO-3** | Use the knowledge of Beta and Gamma functions in evaluating improper integrals. |
| **CO-4** | Evaluate double integrals, simple triple integrals & find areas and volume. |
| **CO-5** | Find the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential. |
| **CO-6** | Apply Green's, Stokes' and Gauss divergence theorems to solve problems. |

## SYLLABUS: APPLIED PHYSICS (B19BS1203)
(Common to CE, CSE,ECE, EEE & IT)

**UNIT-I: WAVE OPTICS: Interference:** Principle of super position. Interference of light, interference in thin films (reflected light) – Wedge film and Newton`s rings – Applications

**Diffraction:** Types of diffraction, Fraunhoffer diffraction at a single alit, Diffraction grating, grating spectrum. Missing order, Resolving power, Rayleigh's Criterion, Resolving power of Grating, Telescope, Microscope (qualitative treatment only)

**UNIT-II: DIELECTRICS AND MAGNETICS: Dielectrics** : Introduction to dielectrics, Electric Polarization, Dielectric polarizability, Susceptibility, Dielectric constant, Types of Polarization, Frequency dependence of Polarization, Internal field in a dielectric, Claussius and Mosotti equation, Applications of dielectrics.

**Magnetics**: Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials, Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications.

**UNIT-III: LASERS AND FIBER OPTICS: Lasers**: Introduction, Interaction fof radiation with matter, condition for light amplification, Einstein's relations. Requirements of lasers device Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

**Fiber Optics**: Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

**UNIT-IV: SEMICONDUCTORS:** Introduction, intrinsic semi conductors, density of charge carries, Fermi energy, Electrical conductivity – Extrinsic semi conductors – P-type and N-type, Density of charge carriers, dependence of Fermi energy on carrier concentration and temperature, direct and indirect band – gap semi conductors, Hall effect, Applications of Hall effect. Drift and diffusion currents, Continuity equation, applications of semi conductors.

**UNIT-V: ULTRASONICS AND NANOMATERIALS: Ultrasonics:** Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating, applications of ultrasonics.

**Nanomaterials:** Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemical vapour Deposition and Sol – Gel methods, Characterization techniques for Nano materials, Carbon nanotubes (CNTS), Applications ofNano materials.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1203** | |
| **Course Title: APPLIED PHYSICS** | |
| **CO-1** | **Interpret** the behavior of light radiation in interference and diffraction Phenomena and their applications. |
| **CO-2** | **Explain** the properties of dielectric and magnetic materials suitable for engineering applications. |
| **CO-3** | **Explain** the important aspects of semiconductors and electrical conductivity in them. |
| **CO-4** | **Understand** the basics of modern technologies lasers, optical fibers and ultrasonics and their utility in various fields. |
| **CO-5** | **Demonstrate** the synthesis methods and applications of nano materials. |

## SYLLABUS: DIGITAL LOGIC DESIGN (B19CS1202)

(Common to CSE & IT)

**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 TwoLevel Implementations. Exclusive-OR Function

**UNIT-III: Combinational Logic Design:** Multiplier. Magnitude Analysis Procedure. Design Procedure. Binary Adder-Subtractor. Decimal Adder. Binary Comparator. Decoders. Encoders. Multiplexers. HDL Models of Combinational Circuits.

**UNIT-IV: Sequential Logic design:** Sequential Circuits .Latches. Flip-Flops. RS- Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D Flip Flops, Truth and Excitation Tables, Conversion of 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 andCorrection. Read-Only Memory. Programmable Logic Array. Programmable Array Logic.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1202** | |
| **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: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING (B19CS1203)

(Common to CSE & IT)

**UNIT-I: Algorithms- Performance analysis, Searching and Sorting:** Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Searching–Linear and binary search methods.

Sorting –Bubble sort, Insertion sort, Selection Sort, Quick sort, Merge sort, comparison ofsorting methods.

Representation of single, two dimensional arrays, Sparse matrices and their representation.

**UNIT-II: Stacks and Queues:** Stack and Queue ADTs, array and linked list representations, applications- infix to postfix,Postfix Evaluation, recursion, Circular queue-insertion and deletion, Dequeue ADT.

**UNIT-III: Introduction to Python:** Python – Numbers, Strings, Variables, operators, expressions, statements, String operations, Math function calls, Input / Output statements, Conditional If, while and for loops, User defined Functions, parameters to functions, recursive functions, Turtle Graphics.

**UNIT-IV: Data Structures and Idiomatic Programming in Python:** Lists, Tuples, Dictionaries, Strings, Files and their libraries. Beautiful Idiomatic approach tosolve programming problems.

**UNIT-V: Event driven Programming:** Turtle Bar Chart, Event Driven programming. Key press events, Mouse events, timerevents.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS1203** | |
| **Course Title: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING** | |
| **CO-1** | Ability to implement various searching and sorting techniques. |
| **CO-2** | Student will be able to write programs to implement stack and queues |
| **CO-3** | Proficiency in creating based applications using the Python Programming Language. |
| **CO-4** | To be able to understand the various data structures available in Python programming language and apply them in solving computational problems. |
| **CO-5** | To be able to draw various kinds of plots using PyLab and Event driven Programming. |

## SYLLABUS: ENGINEERING DRAWING (B19ME1201)

(Common to CSE,ECE & IT)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on circles.
**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only),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 paralleleither 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 theother 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 pla nes.

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

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME1201** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

## SYLLABUS: APPLIED PHYSICS LAB (B19BS1206)

(Common to CSE, ECE & IT)

**LIST OF EXPERIMENTS:**

1. Determination of the Wavelength of light from a source – Diffraction Grating – Normal incidence.
2. Determination of radius of curvature of Plano convex lens – Newton's Rings.
3. Determination of the thickness of a thin spacer using interference – Air Wedge method.
4. Determination of Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
6. Determination of Temperature Coefficient of Resistance of a thermistor
7. Determination of resistivity of semiconductors by Four probe method.
8. Determination of dielectric Constant by charging and discharging method.
9. Resolving power of a grating.
10. Determination of the velocity of sound - Volume Resonator method.
11. Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum.
12. Verification of the laws of vibrations in stretched stings - Sonometer.
13. Determination of Magnetic susceptibility by Quinke's method.
14. Study of variation of dielectric constant with temperature.
15. Determination of the frequency of the AC supply – AC Sonometer.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19BS1206** | |
| **Course Title: APPLIED 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: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING LAB (B19CS1205)

(Common to CSE & IT)

1. C program for sorting a list using Bubble sort and then apply binary search.
2. C program to implement the operations on stacks.
3. C program to implement the operations on circular queues.
4. C program for evaluating a given postfix expression using stack.
5. C program for converting a given infix expression to postfix form using stack.
6. C program for implementing the mazing problem.
7. C program for the representation of polynomials using linked list and for the addition of two such polynomials.
8. C program for quick sort .
9. C program for Merge sort.
10. Design a Python script to convert a Binary number to Decimal number and verify if it is a Perfect number.
11. Design a Python script to determine if a given string is a Palindrome using recursion
12. Design a Python script to sort numbers specified in a text file using lists.
13. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.
14. Design a Python Script to determine the Square Root of a given number without using inbuilt functions in Python.
15. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.( 0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <= 59)
16. Design a Python Script to find the value of (Sine, Cosine, Log, PI, e ) of a given number using infinite series of the function.
17. Design a Python Script to convert a given number to words
18. Design a Python Script to convert a given number to roman number.
19. Design a Python Script to generate the frequency count of words in a text file.
20. Design a Python Script to print a spiral pattern for a 2 dimensional matrix.
21. Design a Python Script to implement Gaussian Elimination method.
22. Design a Python script to generate statistical reports(Minimum, Maximum, Count, Average, Sum etc) on public datasets.
23. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class,
24. second class, third class and failed.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19CS1205** | |
| **Course Title: BASIC DATA STRUCTURES AND PYTHON PROGRAMMING LAB** | |
| **CO-1** | Student will be able to write programs to implement stack and queues |
| **CO-2** | Ability to implement various searching and sorting techniques. |
| **CO-3** | To develop proficiency in creating based applications using the Python Programming Language. |
| **CO-4** | To be able to understand the various data structures available in Python programming language and apply them in solving computational problems. |
| **CO-5** | To be able to do testing and debugging of code written in Python. |
| **CO-6** | To be able to draw various kinds of plots using PyLab. |
| **CO-7** | To be able to do text filtering with regular expressions in Python |

## SYLLABUS: COMMUNICATION SKILLS LAB (B19HS1203)

(Common to CSE& IT)

**UNIT-I:** JAM, Common Errors Neutralizing accent

**UNIT-II:** Telephonic Etiquette,Role Plays, Poster Presentations

**UNIT-II:** Presentation SkillsPublic Speaking

Data Interpretation

**UNIT-IV:** Group Discussion

Do's and Don'ts

**UNIT-V:** Curriculum Vitae

Covering Letter

Interview Skills

Mock Interviews, FAQ's

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19HS1203** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

**SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19IT1201)**
(Information Technology)

**Apply Design Thinking on the following Streams to**

**Project Stream 1**: Electronics, Robotics, IOT and Sensors

**Project Stream 2**: Computer Science and IT Applications

**Project Stream 3**: Mechanical and Electrical tools

**Project Stream4**: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources,Agriculture, Environmental science and other fields of engineering.

## INFORMATION TECHNOLOGY
## SYLLABUS: DISCRETE MATHEMATICAL STRUCTURES (B19IT2101)

**UNIT-I : Mathematical Logic:** Propositional Calculus: Statements and Notations, Connectives, Well-formed Formulae, 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 for Predicate Calculus.

**UNIT-II : Combinatorics**: Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations,Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Theorems, Binomial and Multinomial Coefficients, Principles of Inclusion–Exclusion.

**UNIT-III: Relations and Algebraic Structures: Relations:** Definition of Relation, Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Transitive Closure, Equivalence, Compatibility andPartial Ordering Relations, Hasse Diagrams.

**Algebraic Structures:** Algebraic Systems, Semi Groups, Monoids, Groups, and Abelian Group, Homomorphism of Semi Groups, Monoids and Groups.

**UNIT-IV: Recurrence Relations** : Generating Functions, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relationsby Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations

**UNIT-V: Graph Theory:** Basic Concepts of Graphs, Sub graphs, Isomorphism of Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite graphs, Planar Graphs, Euler's Formula.

**Trees**: Definition of Tree, properties of Trees, Different tree structures, Binary trees,Spanning trees, Minimal Spanning Trees, Kruskal's and Prim's Algorith

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19IT2101** | |
| **Course Title: DISCRETE MATHEMATICAL STRUCTURES (B19IT2101)** | |
| **CO-1** | Write and verify the arguments for their validity using propositional and predicate logic. |
| **CO-2** | Observe different counting methods and apply in their fields of study. |
| **CO-3** | Identify various types of relations and utilize their properties. |
| **CO-4** | Understand different Algebraic structures and their properties. |
| **CO-5** | Formulate and solve the recurrence relations. |
| **CO-6** | Utilize the concepts in graphs and trees to understand different data structures. |

## SYLLABUS: PRINCIPLES OF SOFTWARE ENGINEERING (B19IT2102)

**UNIT-I:** The Nature of Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths, How It All Starts. A Generic Process Model, Process Assessment and Improvement, Prescriptive Process
Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology.

**UNIT-II:** Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, A Tool Set for the Agile Process, Software Engineering Knowledge ,Core Principles, Principles That Guide Each Framework Activity, Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

**UNIT-III:** Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling, Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements
Modelling, Requirements Modeling for WebApps.

**UNIT-IV:** Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model, Software Architecture, Architectural Genres, Architectural Styles, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow, What Is a Component?, Designing Class-Based Components, Conducting Component- Level Design, Component-Level Design for WebApps, Designing Traditional Components, Component-Based Development.

**UNIT-V:** The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation, Elements of Software Qualtiy Assurance, SQA Tasks, Goals & Metrics, Statistical SQA, Software Reliability, A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for WebApps, Validation Testing, System Testing, The Art of Debugging, Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19IT2102** | |
| **Course Title: PRINCIPLES OF SOFTWARE ENGINEERING** | |
| **CO-1** | Apply software engineering concepts to define a problem and perform requirements engineering. |
| **CO-2** | Design UML diagrams for the requirements gathered |
| **CO-3** | Implement the designed problem in object oriented programming language |
| **CO-4** | Test whether all the requirements specified have been achieved or not |

## SYLLABUS: MICRO PROCESSOR (B19IT2103)

**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: Parallel IO interface-8255-Block diagram and its control word, Timer Interface-8253-Block diagram and programming of 8253/54.

Interfacing peripherals to INTEL 8085: Block diagram of programmable Interruptcontroller Interface-8259A Its functions and interrupt operation.

**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.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19IT2103** | |
| **Course Title: MICRO PROCESSOR (B19IT2103)** | |
| **CO-1** | Student will be able to apply the knowledge of 8085 architecture and instruction set. |
| **CO-2** | Student will be able to apply the knowledge of microprocessor for counter designing and interrupts signaling. |
| **CO-3** | Students will be able to design interfacing circuits between 8085 with different peripheral and memory components. |
| **CO-4** | Student will be able to apply the knowledge of 8086 architecture and instruction set. |

## SYLLABUS: ADVANCED DATA STRUCTURES (B19IT2104)

**UNIT-I:** Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal ,Reversing Single Linked list, Applications on Single Linked list- Polynomial Expression Representation ,Addition and Multiplication, Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

**UNIT-II:** Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications-Expression Trees, Heap Sort.

**UNIT-III:** Advanced and Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees- rotations, insertion, deletion operations, Red-Black Trees, Definition, Representation of a Red-Black Tree, Searching a Red-Black Tree, Inserting into a Red Black Tree, Deletion from a Red-Black Tree, Joining Red-Black Trees, Splitting a Red-Black tree.

**UNIT-IV:** Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims & Kruskals Algorithm, Dijkstra's shortest path, Transitive closure. Warshall's Algorithm,

**UNIT-V:** Sorting: Medians and order statistics, External Sorting, Introduction, K-way Merging, Buffer Handling for parallel Operation, Run Generation, Optimal Merging of Runs.

Hashing: Introduction, Static Hashing, Hash Table, Hash Functions, Secure Hash Function, Overflow Handling, Theoretical Evaluation of Overflow Techniques, Dynamic Hashing- Motivation for Dynamic Hashing, Dynamic Hashing Using Directories, Directory lessDynamic Hashing, Alternate hash functions (mid-square, folding, digit analysis), Double Hashing

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19IT2104** | |
| **Course Title: ADVANCED DATA STRUCTURES** | |
| **CO-1** | Student will be able to Implement data structures like linked lists for given problems. |
| **CO-2** | Student will be able to Construct various types of tree structures and apply graph algorithms for the given data |
| **CO-3** | Student will be able to Implement advanced data structures into the applications such as balanced search trees, AVL Trees, and Red-Black Trees |
| **CO-4** | Student will be able Describe the hash function and concepts of collision and its resolution methods |

## SYLLABUS: COMPUTER ORGANIZATION (B19IT2105)

**UNIT-I:** Basic Structure of Computers: Basic Organization of Computers, Historical Perspective, Bus Structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection Codes. Computer
Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

**UNIT-II:** Register Transfer Language and Microoperations: Register Transfer language. Register Transfer Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro Operations,Shift Micro Operations, Arithmetic Logic Shift Unit.
Basic Computer Organization and Design: Instruction Codes, Computer Register, Computer Instructions, Instruction Cycle, Memory – Reference Instructions. Input –Output and
Interrupt, Complete Computer Description,

**UNIT-III:** Central Processing Unit: General Register Organization, STACK Organization. Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.
Microprogrammed Control: Control Memory, Address Sequencing, Micro Program example, Design of Control Unit

**UNIT-IV:** Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative
Memory, Cache Memory, Virtual Memory. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts,
Direct Memory Access.

**UNIT-V:** Multi Processors: Introduction, Characteristics of Multiprocessors, Interconnection Structures, Inter Processor Arbitration.
Pipeline: Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, ArrayProcessor.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19IT2105** | |
| **Course Title: COMPUTER ORGANIZATION** | |
| **CO-1** | Illustrate the concepts of of data representation, Arithmetic procedures and various micro operations |
| **CO-2** | Develop a detailed understanding of architectures and functionalities of control unit and central processing unit |
| **CO-3** | Describe and analysis of input output system, different types of Memories and evaluate memory requirement in basic computer |
| **CO-4** | Illustrate the concepts of multiprocessing and pipelining systems |

## SYLLABUS: OBJECT ORIENTED PROGRAMMING THROUGH C++ (B19IT2106)

**UNIT-I:** Introduction to C++: Difference between C and C++, Evolution of C++, The Object Oriented Technology, Disadvantage of Conventional Programming-, Key Concepts of
Object Oriented Programming, Advantage of OOP, Object Oriented Language.

**UNIT-II:** Classes and Objects &Constructors and Destructor: Classes in C++-Declaring Objects, Access Specifiers and their Scope, Defining Member Function-Overloading Member Function, Nested class, Constructors and Destructors, Introduction, Constructors and Destructor- Characteristics of Constructor and Destructor, Application with Constructor,
Constructor with Arguments (parameterized Constructor, Destructors- Anonymous Objects.

**UNIT-III:** Operator Overloading and Type Conversion & Inheritance: The Keyword Operator, Overloading Unary Operator, Operator Return Type, Overloading Assignment Operator (=), Rules for Overloading Operators, Inheritance, Reusability, Types of Inheritance, Virtual Base Classes, Object as a Class Member, Abstract Classes, Advantages of Inheritance-Disadvantages of Inheritance.

**UNIT-IV:** Pointers & Binding Polymorphisms and Virtual Functions: Pointer, Features of Pointers,
Pointer Declaration, Pointer to Class, Pointer Object, The this Pointer, Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Binding in C++, Virtual Functions, Rules for Virtual Function, Virtual Destructor.

**UNIT-V:** Generic Programming with Templates, Need for Templates, Definition of class Templates, Normal Function Templates, Overloading of Template Function, Bubble Sort Using Function Templates, Difference Between Templates and Macros, Linked Lists with
Templates, Exception Handling, Principles of Exception Handling, The Keywords try throwand catch, Multiple Catch Statements – Specifying Exceptions.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19IT2106** | |
| **Course Title : OBJECT ORIENTED PROGRAMMING THROUGH C++** | |
| **CO-1** | Analyze the procedural and object oriented paradigm. |
| **CO-2** | Apply object oriented concepts to applications using dynamic memory management techniques and overloading concepts. |
| **CO-3** | Apply inheritance, pointer, polymorphism and virtual functions concepts. |
| **CO-4** | Understand generic programming, Exception handling. |

## SYLLABUS: ADVANCED DATA STRUCTURES LAB (B19IT2107)

### LIST OF EXPERIMENTS:

1. Write a program to implement the Single Linked List operations (Insertion, Deletion, searching, reverse).
2. Write a program to implement the operations on stacks using Linked List.
3. Write a program to implement the operations on Queue using Linked List.
4. Write a program to add two Polynomials using Linked List.
5. Write a program to implement the Circular Single Linked List operations (Insertion, Deletion, searching, reverse).
6. Write a program to implement the Double Linked List operations (Insertion, Deletion, searching).
7. Write a program to sort list of array elements using Heap Sort.
8. Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion
9. Write a program to perform various operations i.e., insertions and deletions on AVL trees.
10. Write a program to implement Dijkstra's algorithm to find shortest path in the graph.
11. Write a program Implementation of Breadth First Search Techniques
12. Write a program Implementation of Depth First Search Techniques.
13. Write a program to implement Prim's algorithm to generate a min-cost spanning tree.
14. Write a program to implement Krushkal's algorithm to generate a min-cost spanning tree.
15. Write a program to implementation of Static Hashing (Use Linear probing for collision resolution)

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19IT2107** | |
| **Course Title: ADVANCED DATA STRUCTURES LAB** | |
| **CO-1** | Student will be able to Implement data structures like linked lists for given problems. |
| **CO-2** | Student will be able to Construct various types of tree structures and apply graph algorithms for the given data |
| **CO-3** | Student will be able to Implement advanced data structures into the applications such as balanced search trees, AVL Trees, and Red-Black Trees |
| **CO-4** | Student will be able Describe the hash function and concepts of collision and its resolution methods |

## SYLLABUS: OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB (B19IT2108)

### LIST OF EXPERIMENTS:

1. Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.
2. Write a C++ program to declare Struct. Initialize and display contents of member variables.
3. Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
4. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.
5. Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).
6. Write a C++ to illustrate the concepts of console I/O operations.
7. Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.
8. Write a C++ program to allocate memory using new operator.
9. Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3)
10. Write a C++ program to create an array of pointers. Invoke functions using array objects.
11. Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtual keyword

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19IT2108** | |
| **Course Title: OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB** | |
| **CO-1** | Apply the basic concepts in C++ like Class and objects |
| **CO-2** | Analyze memory management techniques like constructor, destructor and overloading mechanisms |
| **CO-3** | Apply reusability of code and usage of exception handling and generic programming |

## SYLLABUS: PROFESSIONAL ETHICS AND HUMAN VALUES (B19MC2101)

**UNIT-I: Human Values:** Morals, Values and Ethics-Integrity-Work Ethic-Service learning Civic Virtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence Character Spirituality.

**UNIT-II: Engineering Ethics:** Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmasMoral autonomy- Kohlberg's theory- Gilligan's theory-Consensus and controversy Models of professional roles-Theories about right action-Self-interest -Customs and religion Uses of Ethical theories Valuing time Cooperation Commitment.

**UNIT-III: Engineering as Social Experimentation:** Engineering As Social Experimentation- Framing the problem- Determining the facts codes of Ethics- Clarifying Concepts- Application issues Common Ground - General Principles- Utilitarian thinking respect for persons.

**UNIT-IV: Engineers Responsibility for Safety and Risk:** Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety- Intellectual Property rights (IPR).

**UNIT-V: Global Issues:** Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers-Computer codes of Ethics- Weapons
Development -Ethics and Research Analyzing Ethical Problems in research.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19MC2101** | |
| **Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES** | |
| **CO-1** | Identify and analyze an ethical issue in the subject matter under investigation or ina relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work. |
| **CO-2** | Identify the multiple ethical interests at stake in a real-world situation or practice and Articulate what makes a particular course of action ethically defensible. |
| **CO-3** | Assess their own ethical values and the social context of problems. |
| **CO-4** | Identify ethical concerns in research and intellectual contexts, including academicintegrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects. |
| **CO-5** | Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research. |

## INFORMATION TECHNOLOGY
## SYLLABUS: PROBABILITY AND STATISTICS (B19 BS 2202)

**UNIT-I: Descriptive statistics and methods for data science:** Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variables: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance), Skewness, Kurtosis

**Correlation**: Definition, Karl Pearson’s Coefficient of Correlation, Limits for correlation coefficient, Rank Correlation, Spearman’s formula for rank correlation coefficient (without proofs).

**Regression Analysis:** Regression Lines, Regression Coefficients and their properties (without proofs).

**Curve fitting**: Method of least Squares, fitting of a Straight line, Fitting of a Parabola.

**UNIT-II: Random Variables and Probability functions:** Review of 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. Introduction to Joint random variable and its Probability functions.

**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 Functionand Probability generating Function of a Random Variable.

**UNIT-III: Discrete and Continuous Distributions: 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, Varianceand Memory less property of Exponential distribution.

**UNIT-IV: Sampling theory and Testing of Hypothesis: 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 Degrees of freedom.

**Large Sample Theory:** Test of significance of single sample proportion, Test ofsignificance for difference of proportions.

**Small Sample Theory:** Student’s-t-distribution: definition, t-test for single mean, t-test fordifference 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.

**UNIT-V: Queuing Theory:** Queue description, Birth and Death Process, Distribution of Inter-arrival times, Distributionof service times, Kendall's representation of a queuing model, Operating characteristics of a queuing 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: B19 BS 2202** | |
| **Course Title: PROBABILITY AND STATISTICS** | |
| **CO-1** | Understand the concepts of data science and fit a best suitable curve for the given data |
| **CO-2** | Identify the random variable as discrete/continuous and analyse it. |
| **CO-3** | Predict the discrete distribution suitable for the given data from its moments. |
| **CO-4** | Predict the continuous distribution suitable for the given data from its moments |
| **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: JAVA PROGRAMMING (B19 IT 2201)

**UNIT-I:** Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final, Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator ( = ), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.

**UNIT-II:** Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

**UNIT-III:** Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in ComputerMemory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two- dimensional Arrays, Arrays of Varying Lengths, Three- dimensional Arrays, Arrays as Vectors.

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

**UNIT-IV:** Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto- boxing and Auto-unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions, try-with-resources, Catching Subclass Exception, Custom Exceptions, Nested try and catch Blocks, Rethrowing Exception, Throws Clause.

**UNIT-V:** String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Methods for Comparison of Strings, Methods for Modifying Strings, Methods for Searching Strings, Data Conversion and Miscellaneous Methods, Class String Buffer, Class String Builder.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread- Creation of NewThreads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface, Creating JDBC Application, JDBC Batch Processing, JDBC Transaction Management

| **Course Outcomes for Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19 IT 2201** | |
| **Course Title: JAVA PROGRAMMING** | |
| **CO-1** | Develop applications using basic java concepts |
| **CO-2** | Develop applications using object oriented programming concepts |
| **CO-3** | Develop error free applications using exception handling mechanisms and multi tasking applications using multithreading concepts |
| **CO-4** | Develop interactive Jdbc applications with database connectivity |

## SYLLABUS: OPERATING SYSTEMS (B19 IT2202)

**UNIT-I:** Operating Systems (OS) Overview: OS Concepts, OS functions, Evaluation of Operating systems. OS Services, OS structures: Monolithic structure, Layered structure, Micro Kernel structure, Modular structure, Virtual Machines, Interrupts, Systems calls- Types of System Calls, OS debugging, OS generations.

**UNIT-II:** Process Concept: Basic concepts, Process states, process control block, Operations on processes, Process Scheduling: Scheduling Criteria, Scheduling Algorithms. Multiple Processor Scheduling, Thread Scheduling, Examples. Multithreaded Programming: Multithreading Models, Thread Libraries, Threading Issues, Examples.

**UNIT-III:** Process Concurrency and Synchronization: Introduction, Race Condition, Critical Region, Mutual Exclusion, Peterson's Solution, Hardware Support, Operating System Support, Semaphores, Monitors, Classic Synchronization problem: Reader's-Writer's Problem, Barber problem, Producer –Consumer problem, Dining philosopher's problem.

Deadlocks: Resources, Conditions for resource deadlocks, Graph models of deadlocks, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.

**UNIT-IV:** Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Free space Management Techniques, Paging, Virtual Memory Management: Introduction, Demand paging ,Copy on-write, Page replacement, Page replacement algorithms, Frame allocation, Inverted paging, Pre-Paging, Segmentation, Paged Segmentation, Thrashing, Memory-mapped files.

**UNIT-V:** File Systems: Files, Directories, File system implementation, management and optimization.

Secondary-Storage Structure: Overview of Disk structure, Disk scheduling, RAID structure. System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control List (ACLs), Revocation of access rights, Capabilities List (c-List) .

**Case Studies:** Study of Operating System Functionalities in various operating Systems like Windows, Unix, Linux and Mobile Operating Systems.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19 IT2202** | |
| **Course Title: OPERATING SYSTEMS** | |
| **CO-1** | **Describe** basic concepts, Generations, Functions, Services and Structures ofdifferent Operating Systems. |
| **CO-2** | **Describe** the concept of Process, Thread and also **Utilize** different algorithms for Scheduling multiple Processes & Threads. |
| **CO-3** | **Apply d**ifferent Mechanisms to implement Inter Process Communication without occurring dead lock |
| **CO-4** | **Classify** Memory Management Schemes and **Apply and Compare** various Page Replacement Techniques for better allocation |

## SYLLABUS: DATABASE MANAGEMENT SYSTEMS (B19 IT2203)

**UNIT-I:** Introduction: Database system, Characteristics (Database Vs File System), Database Users(Actors on Scene, Workers behind the scene), Advantages of Data base systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

**UNIT-II:** Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

**UNIT-III:** Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams. SQL: Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping,aggregation, ordering, implementation of different types of joins, view(updatable and non- updatable), relational set operations.

**UNIT-IV:** Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NFand 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF), Fifth Normal Form (5NF).

**UNIT-V:** Transaction Concept: Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.
Indexing Techniques: B+ Trees: Search, Insert, Delete algorithms, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes , Index data Structures, Hash Based Indexing: Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19 IT2203** | |
| **Course Title: DATABASE MANAGEMENT SYSTEMS** | |
| **CO-1** | **Analyze** requirements of an organization and develop a database schema in terms of E R model and Relational model. |
| **CO-2** | **Analyze** a query and formulate solution using the knowledge of query languages like SQL. |
| **CO-3** | **Design** well structured relations by applying normalization to remove anomalies in relations. |
| **CO-4** | **Examine** issues in transaction execution, data storage and query processing andcan formulate appropriate solutions. |

## SYLLABUS: THEORY OF COMPUTATION (B19 IT2204)

**UNIT-I:** Finite Automata: Need of Automata theory, Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with Є-Transitions, Minimization of Finite Automata, Finite Automata with output-Mealy and Moore Machines, Applications and Limitation of Finite Automata.

**UNIT-II:** Regular Expressions, Regular Sets, Identity Rules, Equivalence of two RE, Manipulations of REs, Finite Automata and Regular Expressions, Inter Conversion, Equivalence between FA and RE, Pumping Lemma of Regular Sets, Closure Properties of Regular Sets,
Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Right and LeftLinear Regular Grammars, Equivalence between RG and FA, Inter Conversion.

**UNIT-III:** Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, Є- Productions and Unit Productions, Normal Forms-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

**UNIT-IV:** Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description, Language Acceptance of Pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars, Conversion, Application of Pushdown Automata.

**UNIT-V:** Turning Machine: Definition, Model, Representation of TMs-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a TM, Design of TMs, Types of TMs, Church's Thesis, Universal and Restricted TM, Decidable and Un-decidable Problems, Halting Problem of TMs, Post's Correspondence Problem, Modified PCP.
Formal languages and Chomsky Hierarchy.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19 IT2204** | |
| **Course Title: THEORY OF COMPUTATION** | |
| **CO-1** | Analyze and construct Finite Automata from a regular expression, regulargrammar or regular language |
| **CO-2** | Analyze and construct a PDA from CFG or CFL |
| **CO-3** | Analyze and construct a TM from REL or Unrestricted Language. |

**SYLLABUS: JAVA PROGRAMMING LAB (B19IT2205)**

**LIST OF EXPERIMENTS**

Exercise - 1 (Basics)

1. Write a JAVA program to display default value of all primitive data type of JAVA
2. Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.
3. Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

1. Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
2. Write a JAVA program to sort for an element in a given list of elements using bubble sort
3. Write a JAVA program to sort for an element in a given list of elements using merge sort.
4. Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

1. Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.
2. Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

1. Write a JAVA program to implement constructor overloading.
2. Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

1. Write a JAVA program to implement Single Inheritance
2. Write a JAVA program to implement multi level Inheritance
3. Write a java program for abstract class to find areas of different shapes

Exercise - 6 (Inheritance - Continued)

1. Write a JAVA program give example for "super" keyword.
2. Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?

Exercise - 7 (Exception)

1. Write a JAVA program that describes exception handling mechanism
2. Write a JAVA program Illustrating Multiple catch clauses

Exercise – 8 (Runtime Polymorphism)

1. Write a JAVA program that implements Runtime polymorphism
2. Write a Case study on run time polymorphism, inheritance that implements in above problem

Exercise – 9 (User defined Exception)

1. Write a JAVA program for creation of Illustrating throw
2. Write a JAVA program for creation of Illustrating finally
3. Write a JAVA program for creation of Java Built-in Exceptions
4. Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

1. Write a JAVA program that creates threads by extending Thread class .First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds ,(Repeat the same by implementing Runnable)
2. Write a program illustrating isAlive and join ()

Exercise – 11 (Packages)

1. Write a JAVA program illustrate class path
2. Write a case study on including in class path in your os environment of your package.
3. Write a JAVA program that import and use the defined your package in the previous Problem

Exercise - 12(Applet)

1. Write a JAVA program to paint like paint brush in applet.

2. Write a JAVA program to display analog clock using Applet.
3. Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 13 (Event Handling)

1. Write a JAVA program that display the x and y position of the cursor movement using Mouse.
2. Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19IT2205** | |
| **Course Title: JAVA PROGRAMMING LAB** | |
| **CO-1** | Apply primitive data types, Operations, Expressions, Control-flow, Strings injava programming |
| **CO-2** | Examine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism |
| **CO-3** | Analyzing simple inheritance, multi-level inheritance, Exception handlingmechanism |
| **CO-4** | Analyze and Construct Threads, Event Handling, implement packages, developing applets |

## SYLLABUS: UNIX OPERATING SYSTEM LAB (B19IT2206)

### LIST OF EXPERIMENTS.

1. a. Study of Unix/Linux general purpose utility command list: man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown
   b. Study of vi editor
   c. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system
   d. Study of Unix/Linux file system (tree structure)
   e. Study of .bashrc, /etc/bashrc and Environment variables.
2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX ls –l command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls –l | sort
5. Simulate the following CPU scheduling algorithms: Round Robin (b) SJF (c) FCFS (d) Priority
6. Multiprogramming-Memory management-Implementation of fork (), wait (), exec() and exit System calls
7. Simulate the following:
   i. Multiprogramming with a fixed number of tasks (MFT)
   ii. Multiprogramming with a variable number of tasks (MVT)
8. Simulate Bankers Algorithm for Dead Lock Avoidance
9. Simulate Bankers Algorithm for Dead Lock Prevention.
10. Simulate the following page replacement algorithms:
    FIFO b) LRU c) LFU
11. Simulate the following File allocation strategies
    Sequenced (b) Indexed (c) Linked
12. Write a C program that illustrates two processes communicating using shared memory
13. Write a C program to simulate producer and consumer problem using semaphores
14. Write C program to create a thread using pthreads library and let it run its function.
15. Write a C program to illustrate concurrent execution of threads using pthreads library.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19IT2206** | |
| **Course Title: UNIX OPERATING SYSTEM 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** | Students will be able to use Linux environment efficiently |
| **CO-5** | Solve problems using bash for shell scripting |

# SYLLABUS: DATABASE MANAGEMENT SYSTEMS LAB (B19IT2207)

## LIST OF EXPERIMENTS

1. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. a. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)

   b. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non-indexing techniques.

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19IT2207** | |
| **Course Title: DATABASE MANAGEMENT SYSTEMS LAB** | |
| **CO-1** | Utilize SQL to execute queries for creating database and performing data manipulation operations |
| **CO-2** | Examine integrity constraints to build efficient databases |
| **CO-3** | Apply Queries using Advanced Concepts of SQL |
| **CO-4** | Build PL/SQL programs including stored procedures, functions, cursors andtriggers |

# MECHANICAL ENGINEERING

## MECHANICAL ENGINEERING

## SYLLABUS: ENGLISH (B19HS1101)

(Common to CE, CSE, EEE, IT & ME)

**UNIT-I: Lesson: A Drawer full of happiness** from *Infotech English*, Maruthi Publications.

**Listening:** Listening to short audio texts and identifying the topic, context and specific pieces of information to answer a series of questions both in speaking and writing.

**Speaking:** Self-introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.

**Reading:** Skimming text to get the main idea. Scanning to look for specific pieces of information.

**Reading for Writing:** Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.

**Vocabulary:** Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.

**Grammar:** Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures.

**Pronunciation**: Vowels, consonants, plural markers and their realizations.

**UNIT-II : Lesson-: Nehru's letter to his daughter, Indira on her birthday** from *Infotech English*, Maruthi Publications.

**Listening:** Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.

**Speaking**: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.

**Reading:** Identifying sequence of ideas; recognizing verbal techniques that helpto link the ideas in a paragraph together.

**Reading for Writing**: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.

**Vocabulary:** Technical vocabulary from across technical branches (20words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.

**Grammar:** Articles, prepositions, conjunctions, use of synonyms and antonyms.

**Pronunciation**: Past tense markers, word stress-di-syllabic words.

**UNIT-III: Lesson: Stephen Hawking-Positivity' Benchmark'** from *Infotech English*, Maruthi Publications.

**Listening:** Listening for global comprehension and summarizing what is listened to both in speaking and writing.

**Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed.

Functional English: complaining and apologizing.

**Reading:** Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, critical reading.

**Reading for Writing:** Letter writing- types, format and principles of letterwriting, E-mail etiquette, writing a Resume/CV and covering letter.

**Vocabulary:** Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, wordapplications, sequencing of words.

**Grammar:** Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex).

**Pronunciation:** Word stress-poly-syllabic words.

**UNIT-IV: Lesson: Liking a Tree, Unbowed: Wangari Maathai biography** from *Infotech English*, Maruthi Publications.

**Listening:** Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.

**Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: asking for permissions, requesting, Inviting.

**Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

**Reading for Writing:** Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Pamphlet writing, writing for media, writing SOP's.

**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.

**Grammar:** Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.

**Pronunciation**: Contrastive Stress.

**UNIT-V: Lesson: Stay Hungry–Stay Foolish** from *Infotech English*, Maruthi Publications.

**Listening:** Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

**Speaking:** Formal oral presentations on topics from academic contexts–with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.

**Reading:** Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.

**Reading for Writing:** Report writing, writing academic proposals- writing researcharticles: format and style.

**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.

**Grammar:** Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).

**Pronunciation:** Stress in compound words.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1101** | |
| **Course Title: ENGLISH** | |
| **CO-1** | Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English. |
| **CO-2** | Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information. |
| **CO-3** | Build confidence and adapt themselves to the social and public discourses, discussions and presentations. |
| **CO-4** | Apply the principles of writing to paragraphs, arguments, essays and formal/informal communication. |
| **CO-5** | Construct sentences using proper grammatical structures and correct word forms. |

## SYLLABUS: MATHEMATICS-I (B19BS1101)
## (LINEAR ALGEBRA, DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS)
(**Common to All Branches**)

**UNIT-I: Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution oflinear systems by Gauss elimination, Jacobi and Gauss-Seidel methods.

**UNIT-II: Eigen values - Eigen vectors and Quadratic forms:** Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix using Cayley-Hamilton theorem, Reduction to diagonal form, Quadratic forms,Reduction of a Quadratic form to Canonical form.

**UNIT-III: Differential equations of first order and first degree:** Linear, Bernoulli, Exact, Reducible to exact types.
Applications: Orthogonal trajectories, Newton's Law of cooling, Simple electrical circuits.(R-L and R-C circuits only)

**UNIT-IV: Linear differential equations of higher order:** Linear Non-homogeneous equations of higher order with constant coefficients with source (RHS) term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), x V(x). Simultaneous differential equations with constant coefficients, Method of Variation of parameters.

**UNIT-V: Laplace transformation:** Laplace transforms of standard functions, properties, transforms of tf(t), f(t)/t, 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.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1101** | |
| **Course Title: MATHEMATICS – I** | |
| **CO-1** | Solve a given system of linear algebraic equations |
| **CO-2** | Determine Eigen values and Eigen vectors of a system represented by a matrix. |
| **CO-3** | Solve ordinary differential equations of first order and first degree. |
| **CO-4** | Apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits |
| **CO-5** | Solve linear ordinary differential equations of second order and higher order. |
| **CO-6** | Determine Laplace transform, inverse Laplace transform and solve linear ODE |

## SYLLABUS: ENGINEERING PHYSICS (B19 BS1103)

(Common to CE & ME)

**UNIT-I: SCIENCE OF SOLIDS –CRYSTALLOGRAPHY AND NANOMATERIALS: Crystallography:** Basis and lattice, Crystal systems, Bravais lattice, Characteristics of unit cell, Atomic packing fraction for S.C, B.C.C, F.C.C lattices, Miller indices – representation of lattice planes, Diffraction of x rays in Crystals and Bragg's law.

**Nanomaterial's:** Introduction, Salient features of Nano materials, Synthesis methods – Ball milling, Condensation, Chemical Vapour Deposition, Sol – Gel. Characterization techniques for nano materials, Carbon Nano Tubes (C N T s), Applications of Nanomaterials

**UNIT-II: ACOUSTICS & ULTRASONICS**

**Acoustics :** Introduction – Reverberation time – Sabine's formula (Derivation using growth and decay method) – absorption coefficient and its determination – factors affecting acoustics of buildings and their remedies.

**Ultrasonics**: Production of ultrasonics by Magnetostriction and piezoelectric methods – Detection of ultrasonics - acoustic grating – Non-Destructive Testing – pulse echo system through transmission and reflection modes – Applications.

**UNIT-III: ELASTICITY**

**Elasticity:** Stress, Strain; Hooke's law, stress – strain curve, generalized Hooke's law with and without thermal strain for isotropic materials, different types of moduli and theirrelations, bending of beams – Bending moment of a beam – Depression of c

**UNIT-IV: MAGNTICS AND DIELECTRICS**

**Magnetics:** Introduction – Magnetic dipole moment – Magnetization – Magnet'c susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton– Classification of magnetic materials (Dia, Para and Ferro) – Domain concept of Ferromagnetism – Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials.

**Dielectrics**: Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz internal field – Claussius-Mossoti equation – Frequency dependence of polarization – Applications of dielectrics.

**UNIT-V: LASERS AND OPTICAL FIBERS**

**Lasers:** Introduction, Interaction of radiation with matter, conditions for light amplification, Einstein's relations. Requirements of lasers device, Types of lasers, Design and working of Ruby and He – Ne lasers, Laser characteristics and applications.

**Fiber Optics:** Introduction to optical fibers, Principle of light propagation in fiber, Acceptance angle, Numerical aperture, Modes of propagations, types of fibers, classification of fibers based on refractive index profile, applications of fibers with emphasis on fiber optic communication.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1103** | |
| **Course Title: ENGINEERING PHYSICS** | |
| **CO-1** | Explain the structure of solids and their determination |
| **CO-2** | Demonstrate the synthesis methods and applications of nano materials |
| **CO-3** | Understand the concepts of elasticity and different types of moduli and their relation |
| **CO-4** | Explain the sound propagation in buildings and related aspects |
| **CO-5** | Characterize the magnetic and dielectric materials from their basic behaviour and learn their applications. |
| **CO-6** | Understand the basics of modern technologies ultrasonics, lasers and opticalfibers and their applications in various fields |

# SYLLABUS: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B19EE1101)

## (Mechanical Engineering)

**UNIT-I: DC CIRCUITS:** Electrical circuit elements (R - L and C) - Ohms Law- Kirchhoff laws - Series and parallelconnection of resistances with DC excitation. Superposition Theorem.

**UNIT-II: AC CIRCUITS:** Representation of sinusoidal waveforms - Peak, Average and RMS values - Phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits Introduction to three phase AC circuits.

**UNIT-III: DC MACHINES:** Principle of operation of DC generator – EMF equation – types of DC machines – OCC characteristics of DC generator- principle and operation of DC Motor -torque equation – characteristics of DC motors – speed control methods of DC motor- applications

**UNIT-IV: AC MACHINES:** Principle and operation of Single Phase Transformer - OC and SC test on transformer - Equivalent circuit - principle and operation of Induction Motor [Elementary treatmentonly].

**UNIT-V: DIODES & TRANSISTORS:** PN junction diodes – diode applications (half wave and bridge rectifiers), PNP and NPN junction transistor, CB, CE, CC configurations and characteristics-transistor as an amplifier

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19EE1101** | |
| **Course Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING** | |
| **CO-1** | Apply concepts of KVL/KCL in solving DC circuits. |
| **CO-2** | Analyze simple electric circuits with DC excitation and single phase AC circuits consisting of series RL - RC - RLC combinations. |
| **CO-3** | Identify type of electrical machine based on their operation. |
| **CO-4** | Illustrate working principles of induction motor - DC Motor. |
| **CO-5** | Choose correct rating of a transformer for a specific application. |
| **CO-6** | Explain operation of Rectifiers and transistors. |

## SYLLABUS: ENGINEERING DRAWING (B19ME1101)
(Common to CE, EEE & ME)

**UNIT-I: Polygons:** Constructing regular polygons by general methods, inscribing and describingpolygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general method (eccentricity method only),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: B19ME1101** | |
| **Course Title: ENGINEERING DRAWING** | |
| **CO-1** | Apply principles of drawing to Construct polygons and engineering curves. |
| **CO-2** | Apply principles of drawing to draw the projections of points and lines. |
| **CO-3** | Apply principles of drawing to draw the projections of planes |
| **CO-4** | Apply principles of drawing to draw the projections of solids. |
| **CO-5** | Apply principles of drawing to represent the object in 3D view through isometric views. |

## SYLLABUS: ENGINEERING PHYSICS LAB (B19BS1106)
**(Common to CE& ME)**

1. Determination of the Rigidity modulus of elasticity of a material - Torsional pendulum.
2. Determination Young's modulus by single Cantilever oscillations method.
3. Verification of the laws of vibrations in stretched strings – Sonometer
4. Magnetic field along the axis of a current carrying coil –Stewart and Gee's apparatus.
5. Determination of Magnetic susceptibility by Quinke's method.
6. Determination of velocity of sound - Volume Resonator method.
7. Determination of dielectric constant by charging and discharging method.
8. Determination of wave length of lasers by diffraction grating
9. Determination of wave length of light from a source using Diffraction Grating by Normal incidence method.
10. Determination of radius of curvature of Plano convex lens – Newton's Rings.
11. Determination of the thickness of a thin spacer using interference – Air Wedge method.
12. Verification of Laws of series and parallel combinations of resistances – Carey Foster's bridge.
13. Resolving power of a grating.
14. Determination of Temperature Coefficient of Resistance of a thermistor.
15. Determination of resistivity of semiconductors by Four probe method.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1106** | |
| **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 LAB (B19HS1102)
**(Common to All Branches)**

**UNIT-I:** Pronunciation

Letters and Sounds

The Sounds of English

Phonetic Transcription

**UNIT-II:** Past tense markers

Word stress-di-syllabic words

Poly-syllabic words

**UNIT-III:** Rhythm & Intonation

**UNIT-IV:** Contrastive Stress (Homographs)

**UNIT-V:** Word Stress: Weak and Strong forms

Stress in compound words

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19HS1102** | |
| **Course Title: ENGLISH LAB** | |
| **CO-1** | Remember and understand the different aspects of English language proficiency with emphasis on LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening comprehension. |
| **CO-4** | Exhibit an acceptable etiquette essential in social settings. |
| **CO-5** | Get awareness on mother tongue influence and neutralize it in order to improve fluency and clarity in spoken English. |

## SYLLABUS: WORK SHOP PRACTICE LAB (B19ME1102)
**(Mechanical Engineering)**

**LIST OF EXPERIMENTS**

**CARPENTRY:**

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

**FITTING:**

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

**TIN SMITHY**

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

| Course Outcomes for First Year First Semester Course | |
|---|---|
| **Course Code: B19ME1102** | |
| **Course Title: WORK SHOP PRACTICE LAB** | |
| **CO-1** | Apply wood working skills in real world applications. |
| **CO-2** | Build different parts with metal sheets in real world applications. |
| **CO-3** | Apply fitting operations in various applications. |
| **CO-4** | Apply different types of basic electric circuit connections. |

## MECHANICAL ENGINEERING
## SYLLABUS: MATHEMATICS – II (B19BS1201)
## (NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS)
(Common to CE, EEE, & ME)

**UNIT-I: Interpolation:** Interpolation, forward differences, backward differences, Central differences and relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange interpolation.

**UNIT-II: Solution of Algebraic and Transcendental Equations & Numerical Integration and solution of Ordinary Differential equations:** Introduction, Bisection method, Method of false position, Iteration method &Newton- Raphson method. Trapezoidal rule, Simpson's 1/3 rule, Solution of ordinary differential equations by Taylor's method, Picard's method, Euler's method, Modified Euler's method, Fourth orderRunge-Kutta method.

**UNIT-III: Partial differentiation:** Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.
Applications: Taylor series expansion for a function of two variables, Maxima and Minima of functions of two variables with and without constraints, Lagrange's method. Leibnitz's rules for differentiation under integral sign.

**UNIT-IV: First order and higher order partial differential equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of Lagrange linear equation .Solutions of Linear homogeneous and non-homogeneous partial differential equations with constant coefficients –source (RHS) terms of the type $e^{ax+by}$, sin (ax+by), cos (ax+by), $x^m y^n$.

**UNIT-V: Applications of partial differential equations:** Method of separation of variables, One – dimensional wave equation, the Alembert'ssolution, one- dimensional heat equation

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19BS1201** | |
| **Course Title: MATHEMATICS–II** | |
| **CO-1** | Fit an interpolation formula and perform interpolation for an equally spaced data as well as unequally spaced data. |
| **CO-2** | Find a real root of algebraic and transcendental equations, evaluate numerically certain definite integrals & solve a first order ordinary differential equation by Euler and RK methods. |
| **CO-3** | Compute partial derivatives, total derivative and Jocobian. |
| **CO-4** | Find maxima/minima of functions of two variables and evaluate some real definite integrals. |
| **CO-5** | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. |
| **CO-6** | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation. |

## SYLLABUS: ENGINEERING MECHANICS (B19ME1202)

(Mechanical Engineering)

**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 Forcesin 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 ina 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**: 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) andrelated Problems.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19ME1202** | |
| **Course Title: ENGINEERING MECHANICS (B19ME1202)** | |
| **CO-1** | Determine the resultant of the given force systems & Analyze force systems using equations of equilibrium. |
| **CO-2** | Determine centroid, center of gravity and moment of inertia of areas and bodies. |
| **CO-3** | Analyze trusses and simple beams. |
| **CO-4** | Identify the frictional forces and its influence on equilibrium. |
| **CO-5** | Determine the displacement, velocity and acceleration relations and apply the work energy and impulse momentum to dynamic systems in rectilinear andcurvilinear motion. |
| **CO-6** | Determine the displacement, velocity and acceleration relations and apply the work energy and impulse momentum to dynamic rigid bodies. |

## SYLLABUS: ENGINEERING CHEMISTRY (B19BS1204)

(Common to CE & ME)

**UNIT-I: Water and its treatment:** Introduction – source of water – impurities of water – Hardness of water – Estimation of water hardness by EDTA method – Boiler troubles: Sludge and scale formation ion boilers; caustic embrittlement; Boiler corrosion; Priming and foaming – Water softening: Lime – Soda Process, Zeolite Process; Demineralization by Ion – Exchange Process. Muncipal Water treatment – Desalination of Brackish water: Electrodialysis; Reverse osmosis. Indian standards and WHO standards of drinking water. Design of drinking water plant

**UNIT-II: Fuels and Lubricants:** Fuels: Introduction – classification of fuels – calorific value: HCV and LCV; Determinationof calorific value of solid fuel 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; cracking FB MB 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: Corrosion and its Prevention:** Definition- Theories of corrosion (i) Dry Corrosion (ii)Wet Corrosion. Types ofElectrochemical corrosion : Pitting corrosion, Differential variation corrosion galvanic corrosion, Stress corrosion. Factors influencing corrosion; Protection from corrosion- material selection and design cathodic Protection, corrosion inhibitors Protective coatings – Galvanizing, Tinning. Inorganic coatings – Anodizing; organic coatings – Paints Varnishes – Special Paints.

**UNIT-IV: High Polymers and Plastics; Rubber & Elastomers** Definition – Types of polymerisation – Free radical mechanism of addition Polymerisation; - Plastics as engineering materials, Thermo Plastics and thermosetting Plastics – compounding of Plastics – Fabrication of Plastics – Preparation, Properties and applicationsof Polyethene , PVC, Nylon 6,6; - Bullet Proof Plastics: Kelvar and Polycarbonate – Fiber reinforced Plastics – Conducting Polymers; Biodegradable Polymers – PHBV; Nylon-2 nylon – 6; Natural rubber: Vulcanization – compounding of rubber, Preparation, Properties and applications of Bu Na – S; Bu Na – N.

**UNIT-V: Building & Construction Materials**

**Ceramics**:- Definition – Characteristics – Classification of Ceramics – Application ofCeramics.

**Portland Cement:-** Manufacture of Portland Cement – Setting and hardening of Portland Cement – Mortar-Concrete – Reinforced Cement Concrete(RCC); Decay of Concrete – Special Cements.

**Refractories**:- Definition – Characteristics – Classification – Properties and failure ofrefractories.

**Insulators:** Thermal and electrical insulators.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19BS1204** | |
| **Course Title: ENGINEERING CHEMISTRY** | |
| **CO-1** | At the end of the course the students learn the advantages and limitations of plastics 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: PROGRAMMING FOR PROBLEM SOLVING USING C (B19CS1201)

(Common to CE, EEE & ME)

**UNIT-I: Introduction to Computers:** Computer Systems, Computing Environments, Computer languages, Creating and running Programs, Computer Numbering System, Storing Integers,Storing Real Numbers

**Introduction to the C Language:** Background, C Programs, Identifiers, Types, Variable, Constants, Input/output, Programming Examples, Scope, Storage Classes and Type Qualifiers.

**Structure of a C Program:** Expressions Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion Statements, Simple Programs, Command Line Arguments.

**UNIT-II: Bitwise Operators:** Exact Size Integer Types, Logical Bitwise Operators, Shift Operators. **Selection & Making Decisions:** Logical Data and Operators, Two Way Selection, Multiway Selection, More Standard Functions

**Repetition:** Concept of Loop, Pretest and Post-test Loops, Initialization and Updating, Event and Counter Controlled Loops, Loops in C, Other Statements Related to Looping, Looping Applications, Programming Examples

**UNIT-III: Arrays:** Concepts, Using Array in C, Array Application, Two Dimensional Arrays, Multidimensional Arrays, Programming Example – Calculate Averages

**Strings:** String Concepts, C String, String Input / Output Functions, Arrays of Strings, String Manipulation Functions String/ Data Conversion, A Programming Example – Morse Code

**Enumerated, Structure, and Union:** The Type Definition (Type def), Enumerated Types, Structure, Unions, and Programming Application

**UNIT-IV: Pointers:** Introduction, Pointers to pointers, Compatibility, L value and R value

**Pointer Applications:** Arrays, and Pointers, Pointer Arithmetic and Arrays, MemoryAllocation Function, Array of Pointers, Programming Application

**Processor Commands**: Processor Commands

**UNIT-V: Functions:** Designing, Structured Programs, Function in C, User Defined Functions, Inter- Function Communication, Standard Functions, Passing Array to Functions, Passing Pointersto Functions, Recursion

**Text Input / Output:** Files, Streams, Standard Library Input / Output Functions, Formatting Input / Output Functions, Character Input / Output Functions

**Binary Input / Output:** Text versus Binary Streams, Standard Library, Functions for Files,Converting File Type.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CS1201** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C** | |
| **CO-1** | Students will learn about computer systems, computing environments, developing of a computer program and Structure of a C Program |
| **CO-2** | Students will learn to use different operators, data types and loops for developing C Programs. |
| **CO-3** | Students will able to write programs using Arrays ,Strings, enumerated types, Structure and Union |
| **CO-4** | Students will able to design and implement programs to analyze the different pointer applications |
| **CO-5** | Students will able to decompose a problem into functions and to develop modular reusable code |

## SYLLABUS: COMPUTER AIDED ENGINEERING DRAWING (B19ME1203)

(Mechanical Engineering)

**UNIT-I: PROJECTIONS OF SOLIDS**: Projections of Regular Solids inclined to both planes –Auxiliary Views.

**UNIT-II: SECTIONS OF SOLIDS:** Sections and Sectional views of Right Regular Solids – Prism,Cylinder, Pyramid, Cone – Auxiliary views.

**DEVELOPMENT OF SOLIDS:** Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

**UNIT-III: INTERPENETRATION OF RIGHT REGULAR SOLIDS**: Intersection of Cylinder VsCylinder, Prism Vs Prism and Cylinder Vs Cone.

**PERSPECTIVE PROJECTIONS:** Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

**UNIT-IV: INTRODUCTION TO COMPUTER AIDED DRAFTING:** Generation of points, lines, curves, polygons, dimensioning. Types of modeling: object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,

**VIEW POINTS AND VIEW PORTS:** view point coordinates and view(s) displayed, examples to exercise different options like save, restore and delete.

**UNIT-V: COMPUTER AIDED SOLID MODELING:** Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling ofBuilding & Building Parts.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19CE1201** | |
| **Course Title: BUILDING MATERIALS AND CONCRETE TECHNOLOGY** | |
| **CO-1** | Apply principles of drawing to draw the projections of solids. |
| **CO-2** | Apply principles of drawing to draw sections of solids and sectional views. |
| **CO-3** | Apply principles of drawing to draw the development of solids |
| **CO-4** | Apply the principles of drawing to draw the intersection of right regular solids. |
| **CO-5** | Apply the principles of drawing to draw the perspective views of points, lines, plane figures and simple solids. |
| **CO-6** | Draw isometric and orthographic drawings using CAD packages. |

## SYLLABUS: ENGINEERING CHEMISTRY LAB (B19BS1207)

(Common to CE & ME)

**LIST OF EXPERIMENTS:**

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. Conductometric 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 of Acid value of oil.

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS1207** | |
| **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 real time 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: COMMUNICATION SKILLS LAB (B19HS1202)

(Common to CE, ECE, EEE & ME)

**UNIT-I:** JAM, Common Errors Neutralizing accent

**UNIT-II:** Telephonic Etiquette,Role Plays, Poster Presentations

**UNIT-III:** Presentation SkillsPublic Speaking Data Interpretation

**UNIT-IV:** Group Discussion Do's and Don'ts

**UNIT-V:** Curriculum Vitae Covering Letter Interview Skills Mock Interviews, FAQ's.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19HS1202** | |
| **Course Title: COMMUNICATION SKILLS LAB** | |
| **CO-1** | Learn different aspects of English language proficiency in LSRW skills. |
| **CO-2** | Apply communication skills through various language learning activities. |
| **CO-3** | Draft job application letters. |
| **CO-4** | Adopt a professional etiquette in formal settings. |
| **CO-5** | Improve fluency and clarity in both spoken and written English. |

## SYLLABUS: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (B19CS1204)

(Common to CE, EEE & ME)

1. Exercise 1:

Write a C program to print a block F using hash (#), where the F has a height of six charactersand width of five and four characters.

Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches andwidth of 5 inches.

Write a C program to display multiple variables.

2. Exercise 2:

Write a C program to calculate the distance between the two points.

Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and pis even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sumof p and q print "Correct values", otherwise print "Wrong values".

3. Exercise 3:

Write a C program to convert a string to a long integer.

Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.

Write a C program to calculate the factorial of a given number.

4. Exercise 4:

Write a program in C to display the n terms of even natural number and their sum.

Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.

3.Write a C program to check whether a given number is an Armstrong number or not.

5. Exercise 5:

Write a program in C to print all unique elements in an array.

Write a program in C to separate odd and even integers in separate arrays.

Write a program in C to sort elements of array in ascending order.

6. Exercise 6:

Write a program in C for multiplication of two square Matrices.

Write a program in C to find transpose of a given matrix.

7. Exercise 7:

Write a program in C to search an element in a row wise and column wise sorted matrix.

Write a program in C to print individual characters of string in reverse order.

8. Exercise 8:

Write a program in C to compare two strings without using string library functions.

Write a program in C to copy one string to another string.

9. Exercise 9:

Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

Write a program in C to demonstrate how to handle the pointers in the program.

10. Exercise 10:

Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.

Write a program in C to add two numbers using pointers

11. Exercise 11:

Write a program in C to add numbers using call by reference.

Write a program in C to find the largest element using Dynamic Memory Allocation

12. Exercise 12:

Write a program in C to swap elements using call by reference.

Write a program in C to count the number of vowels and consonants in a string using a pointer.

13. Exercise 13:

Write a program in C to show how a function returning pointer.

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

14. Exercise 14:

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 program.

Write a program in C to convert decimal number to binary number using the function.

15. Exercise 15:

Write a program in C to check whether a number is a prime number or not using the function.

Write a program in C to get the largest element of an array using the function.

16. Exercise 16:

Write a program in C to append multiple lines at the end of a text file.

Write a program in C to copy a file in another name.

Write a program in C to remove a file from the disk.

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19CS1204** | |
| **Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB** | |
| **CO-1** | Gains Knowledge on various concepts of a C language. |
| **CO-2** | Able to draw flowcharts and write algorithms. |
| **CO-3** | Able design and development of C problem solving skills . |
| **CO-4** | Able to design and develop modular programming skills. |
| **CO-5** | Able to trace and debug a program. |

**SYLLABUS: BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB (B19EE1203)**
(Mechanical Engineering)

**LIST OF EXPERIMENTS:**
**Section A: Electrical Engineering:**
The following experiments are required to be conducted as compulsory experiments

Verification of Kirchhoff laws

Verification of Superposition Theorem.

Swinburne's test on D.C. Shunt machine.

OC and SC tests on single phase transformer.

Speed control of D.C. Shunt motor.

Brake test on D.C. Shunt Motor.

Brake test on D.C. Series Motor

Section B: Electronics Engineering:

The following experiments are required to be conducted as compulsory experiments:

PN junction diode characteristics

Forward bias b) Reverse bias (Cut in voltage and Resistance calculations)

Half wave rectifier with and without filters

Full wave rectifier with and without filters.

Transistor CE characteristics (input and output)

| **Course Outcomes for First Year Second Semester Course** | |
|---|---|
| **Course Code: B19EE1203** | |
| **Course Title: BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB** | |
| **CO-1** | Verify Kirchhoff's Laws & Superposition theorem for dc supply |
| **CO-2** | Analyze the performance of AC and DC Machines by testing |
| **CO-3** | Perform speed control of dc shunt motor |
| **CO-4** | Study I – V Characteristics of Diode |
| **CO-5** | Determine the ripple factor of half wave & full wave rectifiers |

## SYLLABUS: ENGINEERING EXPLORATION PROJECT (B19ME1204)

(Mechanical Engineering)

**Project Stream 1:**

Electronics, Robotics, IOT and Sensors

**Project Stream 2:**

Computer Science and IT Applications

**Project Stream 3:**

Mechanical and Electrical tools

**Project Stream4:**

Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

## MECHANICAL ENGINEERING
## SYLLABUS: MATHEMATICS III (B19BS2101)
(Multivariable Calculus and Fourier Analysis)

**UNIT-I : 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.

**UNIT-II : Fourier Transforms:** Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine andcosine integrals, Fourier transform, Fourier sine and cosine transforms, Finite Fourier transforms, properties, inverse transforms, Parseval's Identities.

UNIT-III: Single and Multiple integrals Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Applications: evaluation of improper integrals, error function and the complimentary error function.

Double and triple integrals, change of variables, Change of order of integration. Applications: Areas and volumes.

**UNIT-IV: Vector Differentiation:** Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal andirrotational vector fields, vector identities.

**UNIT-V: Vector Integration**: Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux.

Vector integral theorems: Green's, Stokes' and Gauss Divergence theorems (without proof) and related Problems.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19BS2101** | |
| **Course Title: MATHEMATICS III** | |
| **CO-1** | Determine Fourier series and half range series of functions. |
| **CO-2** | Determine different Fourier transforms of non-periodic functions and also use them to evaluate integrals. |
| **CO-3** | Use the knowledge of Beta and Gamma functions in evaluating improper integrals. |
| **CO-4** | Evaluate double integrals, simple triple integrals & find areas and volume. |
| **CO-5** | Determine the gradient of a scalar function, divergence and curl of a vector function. Determine scalar potential. |
| **CO-6** | Apply Green's, Stokes' and Gauss divergence theorems to solve problems. |

## SYLLABUS: STRENGTH OF MATERIALS (B19ME2101)

**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: B19ME2101** | |
| **Course Title: STRENGTH OF MATERIALS** | |
| **CO-1** | Understand the concepts of simple stresses and strains under different loads, and apply the knowledge for structural members and calculating principal stresses. |
| **CO-2** | Construct and interpret Shear Force and Bending Moment Diagrams for statically determinate beams under different loading conditions. |
| **CO-3** | Determine stresses due to bending of beams subjected to different loads. |
| **CO-4** | Understand the concepts of strain energy under different loading conditions, and Examine the stresses produced in circular shafts subjected to twisting moments. |
| **CO-5** | Solve for stresses and strains produced in thin and thick walled pressure vessels. |

## SYLLABUS: ENGINEERING THERMODYNAMICS (B19ME2102)

**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 inTransition, Types, Work and Heat, Point and Path function .Zeroth law of thermodynamics, Concept of equality of temperatures- Equation of state- Universal gas constant- Deviations from perfect gas model-Vanderwall's equation of state- Compressibility charts-

**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- 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, Clausius 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, Ericson 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 non- flow process-irreversibility

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2102** | |
| **Course Title: ENGINEERING THERMODYNAMICS** | |
| **CO-1** | Apply the thermodynamic concepts in real life systems and compute properties of various perfect gases. |
| **CO-2** | Analyze the first law of thermodynamics to various thermodynamic systems undergoing different thermodynamic processes |
| **CO-3** | Applythe second law of thermodynamics to working of various heat engine and thermal efficiency of air standard cycles |
| **CO-4** | Analyze the general relation of thermodynamic functions, availability and irreversibility |

## SYLLABUS: MANUFACTURING PROCESSES (B19ME2103)

**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 moulding, Machine moulding, 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 $CO_2$ 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.

**UNIT-IV: Forging Processes**: Forgability, Forging Materials, Classification: smith, drop, press andmachine 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.

| Course Outcomes for Second Year First Semester Course | |
|---|---|
| **Course Code: B19ME2103** | |
| **Course Title: MANUFACTURING PROCESSES** | |
| **CO-1** | Analyze various factors involved in casting process for mould preparation, casting methods, melting, gating system design and casting defects. |
| **CO-2** | Identify various cold and hot working processes such as rolling, extrusion, drawing, spinning. |
| **CO-3** | Analyze various sheet metal operations and forging techniques. |
| **CO-4** | Distinguish various welding processes. |

## SYLLABUS: METALLURGYAND MATERIALS SCIENCE (B19ME2104)

**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, Indices for planes and directions - Imperfection in solids, point defects, Line defects, Planar defects and Volume defects- Concept of Slip & twinning,.

**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 Al-Si phase diagrams- Invariant reactions, eutectic, peritectic, eutectoid, peritectoid reactions, 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.

**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, SG Cast iron-The light alloys- Al & Mg & Titanium alloys- Copper & its alloys: brasses & bronzes, Smart materials- Nano materials.

**UNIT-V:** Composite Materials: Classification of composite materials, dispersion strengthened, particlereinforced and fiber reinforced composites, 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: B19ME2104** | |
| **Course Title: METALLURGYAND MATERIALS SCIENCE** | |
| **CO-1** | Identify the properties of metals with respect to crystal structure and analyze imperfection in crystals. |
| **CO-2** | Compute phase change parameters in isomorphism & eutectic systems and Choose appropriate heat-treatment process fulfilling given criteria. |
| **CO-3** | Analyze various I.T curves and surface hardening methods to obtain required material properties and list various engineering materials used for the specifiedapplications. |
| **CO-4** | Analyze the powder metallurgy process, types and manufacturing methods of composite materials. |

## SYLLABUS: MECHANICAL ENGINEERING DRAWING (B19ME2105)

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 Second Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2105** | |
| **Course Title : MECHANICAL ENGINEERING DRAWING** | |
| **CO-1** | Apply standard empirical formulae for various screw threads, screw fastenings, keys and joints. Identify the various shaft couplings and bearings. |
| **CO-2** | Prepare assembly drawing of various mechanical components. |
| **CO-3** | Identify various symbols for materials, machining operations and welded joints. Calculate tolerances to obtain various fits. Identify geometrical tolerances and surface finish symbols. |
| **CO-4** | Prepare process sheets and production drawings various components |

## SYLLABUS: MECHANICAL ENGINEERING LAB (B19ME2106)

### 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: B19ME2106** | |
| **Course Title: MECHANICAL ENGINEERING LAB** | |
| **CO-1** | Assess the environmental, societal safety and health issue through determining the flash & fire point of various lubricating oils as well as fuels, along with computingthe viscosity of lubricating oils |
| **CO-2** | Functioning and communicating as an individual in a team to write and prepare effective reports on experiments conducted in the laboratory |

## SYLLABUS: MANUFACTURING PROCESSES LAB (B19ME2107)

### LIST OF EXPERIMENTS:

1. Prepare a Sand mould of stepped pulley
2. Prepare a Sand mould of bend pipe
3. Prepare a Sand mould of flanged pipe
4. Inspect the Grain Fineness number of silica sand.
5. Examine the Moisture and clay content in the given moulding sand.
6. Analyze the Compression strength of moulding sand specimen.
7. Analyze the Hardness of moulding sand specimen.
8. Prepare a S hook using forging operations.
9. Prepare a Vent rod using forging operations.
10. Prepare a Lap joint by Arc welding process
11. Prepare a Butt joint by Arc welding process
12. Prepare a T joint by Arc welding process

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2107** | |
| **Course Title: MANUFACTURING PROCESSES LAB** | |
| **CO-1** | Apply the knowledge of casting, welding and forging to make various sand moulds, welded joints and forged Components |
| **CO-2** | Distinguish various moulding sand tests |

## SYLLABUS: PROFESSIONAL ETHICS AND HUMAN VALUES (B19MC2101)

(Common to CSE, IT & Mechanical)

**UNIT-I: Human Values:** Morals, Values and Ethics-Integrity-Work Ethic-Service learning Civic Virtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence Character Spirituality.

**UNIT-II: Engineering Ethics:** Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmasMoral autonomy- Kohlberg's theory- Gilligan's theory-Consensus and controversy Models of professional roles-Theories about right action-Self-interest -Customs and religion Uses of Ethical theories Valuing time Cooperation Commitment.

**UNIT-III: Engineering as Social Experimentation:** Engineering As Social Experimentation- Framing the problem- Determining the facts codes of Ethics- Clarifying Concepts- Application issues Common Ground - General Principles- Utilitarian thinking respect for persons.

**UNIT-IV: Engineers Responsibility for Safety and Risk:** Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety- Intellectual Property rights (IPR).

**UNIT-V: Global Issues:** Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers-Computer codes of Ethics- Weapons Development -Ethics and Research Analyzing Ethical Problems in research.

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19MC2101** | |
| **Course Title: PROFESSIONAL ETHICS AND HUMAN VALUES** | |
| **CO-1** | Identify and analyze an ethical issue in the subject matter under investigation or ina relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work. |
| **CO-2** | Identify the multiple ethical interests at stake in a real-world situation or practice and Articulate what makes a particular course of action ethically defensible. |
| **CO-3** | Assess their own ethical values and the social context of problems. |
| **CO-4** | Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects. |
| **CO-5** | Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research. |

## SYLLABUS: INTRODUCTION TO MACHINE LEARNING USING PYTHON (B19MC2104)

**UNIT-I: Introduction to Python:**

About Python, History, Features of Python, Variables, Data Types, Operations, Operators, FOR loops, IF loops, WHILE loops, Python Classes and Python Methods

**UNIT-II: NumPy Arrays, Pandas and Matplotlib:**

NumPy arrays, Array creation, Indexing and slicing, Lists, Tuples, Dictionary, Sets, Pandas Data Frame: Reading and Writing a Data Frame, Creating and Extracting Features, Conversion of Categorical Data to Numerical Data, Merging Data Frames. Data Visualization: Use of Matplotlib Library for Various Plots like Scatter, Bar, Histogram plots, Introduce Various Correlation Techniques.

**UNIT-III: Introduction to Machine Learning:**

Introduction to Artificial Intelligence (AI), Machine Learning and Deep Learning, Types of Machine Learning: Supervised, unsupervised & Reinforced Learning, Machine Learning Pipeline: Loading, Preprocessing, Normalizing of Data, Train and Test Split, Evaluation Methods

**UNIT-IV: Various ML Algorithms:**

Supervised: *Regression:* Simple Linear, Multiple Linear, Polynomial, Logarithmic, Quadratic, Exponential, Sigmoidal Regression. *Classification:* Decision Tree, K-Nearest Neighbor, Logistic and Support Vector Machine classifiers.

Unsupervised Learning: K-means Clustering, Hierarchical Clustering and DBSCAN.

**UNIT-V: Building models:**

Building of best machine learning model for 4 different real data

| **Course Outcomes for Second Year First Semester Course** | |
|---|---|
| **Course Code: B19MC2104** | |
| **Course Title: INTRODUCTION TO MACHINE LEARNING USING PYTHON** | |
| **CO-1** | Understand basic fundamentals of python programming |
| **CO-2** | Acquire in-sights into Numpy, Pandas & Matplotlib |
| **CO-3** | Understand the importance of machine learning |
| **CO-4** | Differentiate supervised & unsupervised learning |
| **CO-5** | Build his own machine learning algorithm to deal with real data |

## MECHANICAL ENGINEERING
## SYLLABUS: MATHEMATICS-IV (B19BS2201)
## (COMPLEX VARIABLES AND STATISTICAL METHODS)

**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 on the review portion).**
Limit and continuity of a function of a complex variable, derivative, analytic function, entire function, Cauchy-Riemann equations, determine an analytic function based ontheknowledge of its real and imaginary parts, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: thetransformations defined by w = z+c, w = cz, w = 1/z. The Bilinear transformation.

**UNIT-II: Complex Integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula. Expansion of a function in a Taylor series, McLaren series and Laurent series. Types of singularities, Residues, Cauchy's residue theorem. Evaluation of real definite integrals -integration around unit circle
(Theorems without proofs).

**UNIT-III: Difference equations and Z-transforms:** Formation of a difference equation, Rules for finding complimentary function and particularintegral 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:** A brief review of random variables, Binomial, Poisson and Normal distributions, definitionsof pmf/ pdf, notation, mean, variance, moment generating function.
Fitting of Binomial or Poisson distributions for a given frequency distribution.

**UNIT-V: Sampling theory and Testing of Hypothesis: Sampling theory:** Introduction, population and samples, Sampling distribution, standard error, central limit theorem (without proof), level of significance, procedure of testingof hypothesis.
**Large samples:** Testing of hypothesis for single proportion and two proportions.
**Small samples:** Degrees of freedom, Students' t- distribution, t-test for single mean, two means; Chi- squared distribution, test for goodness of a fit.

| **Course Outcomes for Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19BS2201** | |
| **Course Title: MATHEMATICS-IV** | |
| **CO-1** | Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics |
| **CO-2** | Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals. |
| **CO-3** | Formulate and solve linear difference equations. |
| **CO-4** | Use Z-transforms to solve linear difference equations with constant coefficients. |
| **CO-5** | Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution. |
| **CO-6** | Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples. |

## SYLLABUS: ADVANCED STRENGTH OF MATERIALS (B19ME2201)

**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 Second Year Second Semester Course** | |
|---|---|
| **Course Code: B19ME2201** | |
| **Course Title: ADVANCED STRENGTH OF MATERIALS** | |
| **CO-1** | Apply the knowledge of mathematics and engineering fundamentals to solve the problems of slope and deflection of statically determinate beams. |
| **CO-2** | Acquire the knowledge of constructing Shear Force and Bending Moment diagrams for fixed Beams. |
| **CO-3** | Acquire the knowledge of constructing Shear Force and Bending Moment diagrams for continuous Beams. |
| **CO-4** | Apply different theories to design the columns and struts subjected to different load conditions. |
| **CO-5** | Investigate various structural members such as curved bars, subjected to different loading conditions for determination of stresses and Strains. |

## SYLLABUS: APPLIED THERMAL ENGINEERING (B19ME2202)

**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- Improvementsof 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 First Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2202** | |
| **Course Title: APPLIED THERMAL ENGINEERING** | |
| **CO-1** | **Apply** the laws of thermodynamics for estimating the properties of pure substance |
| **CO-2** | **Analyze** the working of vapour power cycles and their performance |
| **CO-3** | **Analyze** the functionality of steam nozzle and steam Turbine in power plants to estimate their performance |
| **CO-4** | **Apply** the laws of thermodynamics for estimating the performance of steam Condensers and steam boilers in power plants |

## SYLLABUS: METAL CUTTING AND MACHINE TOOLS (B19ME2203)

**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, Indexing-Differential Indexing method. **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 First Year Second Semester Course** | |
|---|---|
| **Course Code: B19ME2203** | |
| **Course Title: METAL CUTTING AND MACHINE TOOLS** | |
| **CO-1** | **Analyze** mechanics of metal cutting to determine cutting forces, tool life, tool wear. |
| **CO-2** | **Differentiate** various machining operations on lathe, shaper, planer, slotting and boring machine tool |
| **CO-3** | **Illustrate** various machining operations on milling, drilling, broaching and grinding machines. |
| **CO-4** | **Distinguish** various Unconventional methods of machining process such as AJM, USM, EDM, ECM. |

## SYLLABUS: FLUID MECHANICS (B19ME2204)

**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, free and forced vortex flow – Euler's equation -Bernoulli's equation and its applications-Venturimeter, Orifice Meter, Pitot tube-Momentum Equation.

**UNIT-III: Flow through pipes**: Hagen Poiseuille equation- Reynolds experiment - Loss of head due to friction in pipes, Darcy Weisbach equation, Chezy's equation - Minor losses in pipes - pipes in series and pipes in parallel, total energy line-hydraulic gradient line. Flow through branched pipes.
**Dimensional and Modeling Analysis**: Fundamental and derived dimensions- Dimensionless groups- Rayleigh method- Buckingham's $\pi$-theorem- Model Analysis - Types of similarity- Geometric, Kinematic and Dynamic similarities- Dimensionless numbers- ModelLaws.

**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 Reynold'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 First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME2204** | |
| **Course Title: FLUID MECHANICS** | |
| **CO-1** | Understand the basic concepts and properties of fluids. |
| **CO-2** | Apply the principles of fluid kinematics and dynamics in solving problems. |
| **CO-3** | Analyze and solve fluid flow problems in pipe and apply the concepts of dimensional analysis. |
| **CO-4** | Understand and analyze boundary layer concepts. |
| **CO-5** | Apply compressible fluid flow theory in solving aerospace and other systems. |

## SYLLABUS: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY (B19HS2201)

**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, Monopolisticcompetition 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).

**Financial Accounts:** Preparation of Trading Account, Profit & Loss Account and Balance sheet.

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19HS2201** | |
| **Course Title: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY** | |
| **CO-1** | Able to analyse Demand. |
| **CO-2** | Able to Calculate BEP |
| **CO-3** | Able to understand Pricing Practices |
| **CO-4** | Able to understand Economics Systems and Business Cycles |
| **CO-5** | Able to Calculate Depreciation and Final Accounts |

## SYLLABUS: STRENGTH OF MATERIALS LAB (B19ME2205)

1. Tensile test on mild steel specimen.
2. Compression test on wooden specimen
3. Single and double shear tests on mild steel specimen.
4. Torsion Test on solid circular shaft.
5. Izod impact test on given material
6. Charpy impact test on given material
7. Brinell hardness test on given material
8. Rockwell hardness test on given material
9. Vickers hardness test on given material
10. Compression and tension tests on helical springs
11. .

| Course Outcomes for First Year Second Semester Course | |
|---|---|
| **Course Code: B19ME2205** | |
| **Course Title: STRENGTH OF MATERIALS LAB** | |
| **CO-1** | Analyze the relationship between load and deformation of different materials under the influence of axial (tensile & compressive), shear and bending loads. |
| **CO-2** | Analyze the torsional stresses produced in different machine members, e.g., shafts and springs, and to compute the rigidity modulus of their materials. |
| **CO-3** | Examine the strength of different materials under impact loads. |
| **CO-4** | Determine the indentation hardness of different materials on different hardness scales. |

## SYLLABUS: MACHINE TOOLS LAB (B19ME2206)

1. Perform Step turning & Taper Turning on a given specimen
2. Perform Knurling and Thread Cutting on a given specimen
3. Perform Form turning and Thread cutting on a given specimen
4. Perform Eccentric turning on a given specimen
5. Machining of horizontal, vertical, step and Angular surface on a shaper machine
6. Perform Gear Cutting on a milling machine.
7. Analyze the cutting tool tip temperature in turning.
8. Inspect the single point cutting tool angles
9. Measurement of surface roughness

| **Course Outcomes for First Year First Semester Course** | |
|---|---|
| **Course Code: B19ME2206** | |
| **Course Title: MACHINE TOOLS LAB** | |
| **CO-1** | Distinguish various machining operations on Lathe, Shaper and Milling. |
| **CO-2** | Analyze the shear angle, tool tip temperature and surface roughness by applying the knowledge of metal cutting. |