Estd:1980

# SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)
Accredited by NAAC with 'A' Grade
UG Programmes CE,CSE,ECE,EEE,IT & ME are Accredited by NBA
Chinna Amiram, Bhimavaram-534204. (AP)

| **Regulation: R20** | **I / IV - B.Tech. I - Semester** |
|---|---|

## ELECTRONICS & COMMUNICATION ENGINEERING

## SCHEME OF INSTRUCTION & EXAMINATION
## (With effect from 2020-21 admitted Batch onwards)

| Course Code | Course Name | Category | Cr | L | T | P | Int. Marks | Ext. Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| B20 HS 1101 | English | HS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 BS 1101 | Mathematics-I | BS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 BS 1103 | Applied Chemistry | BS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 CS 1101 | Programming for Problem Solving Using C | ES | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 EC 1101 | Basic Electronics | ES | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 CS 1103 | Programming for Problem Solving Using C Lab | ES | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 BS 1108 | Applied Chemistry Lab | BS | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 EC 1102 | Electronics Workshop | ES | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| | **TOTAL** | | **19.5** | **15** | **0** | **9** | **195** | **455** | **650** |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20HS1101 | HS | 3 | -- | -- | 3 | 30 | 70 | 3Hrs |

**ENGLISH**

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

**Introduction:**

The course is designed to train students in receptive as well as productive skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as GRE, GMAT, IELTS, TOEFL and BEC besides being able to handle the writing tasks and verbal ability components ofcampusplacementtests.Activitybasedteaching-learningmethodswouldbeadoptedto ensure that learners would engage in actual use of language both in the classroom and laboratorysessions.

**Course Objectives:**

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|---|---|
| 1. | To facilitate effective listening skills for better comprehension of varied accents spoken at national and global levels. |
| 2. | To focus on appropriate reading strategies for better comprehension of multiple texts and authentic materials. |
| 3. | To improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations. |
| 4. | To impart effective strategies for good writing and demonstrate the same in both summarizing and analyzing; writing well-organized essays, letters, e-mails, CV's and reports. |
| 5. | To provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing. |

**Course Outcomes:** At the end of the Course the students will be able to

| S.No | OutCome | KL |
|---|---|---|
| 1. | Identify the context, topic and pieces of specific information by understanding andresponding to the social or transactional dialogues spoken by native speakers of English. | K3 |
| 2. | Apply suitable strategies for skimming and scanning to get the main idea of a textand locate specific information. | K3 |
| 3. | Build confidence and adapt themselves to the social and public discourses,discussions and presentations. | K3 |
| 4. | Apply the principles of writing to paragraphs, arguments, essaysand formal/informal communication. | K3 |
| 5. | Construct sentences using proper grammatical structures and correct word forms. | K4 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (8 Hrs)** | **Lesson: A Drawer full of happiness** from *Infotech English*, Maruthi Publications.<br>**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. |

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| | **Speaking:** Self- introduction and introducing others. Asking and answering general questions on topics such as home, family, work, studies and interests.<br>**Reading:** Skimming text to get the main idea. Scanning to look for specific pieces of information.<br>**Reading for Writing:** Paragraph Writing (Hints Development), general essays using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing, punctuation.<br>**Vocabulary:**Technical vocabulary from across technical branches (20) GRE Vocabulary (20), antonyms and synonyms, word applications, verbal reasoning and sequencing of words.<br>**Grammar:** Content words and function words; parts of Speech, tenses, word order in sentences, sentence structures. |
| | |
| **UNIT-II (8 Hrs)** | **Lesson-: Nehru's letter to his daughter, Indira on her birthday**from*Infotech English***,** Maruthi Publications**.**<br>**Listening:** Answering a series of questions about main idea and supporting ideas after listening to audio texts both in speaking and writing.<br>**Speaking**: Discussion in pairs/ small groups on specific topics followed by short structured talks, functional English: greetings and leave takings.<br>**Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.<br>**Reading for Writing**: Identifying the main ideas, rephrasing and summarizing them (précis writing); avoiding redundancies and repetitions.<br>**Vocabulary:** Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words), antonyms and synonyms, word applications.<br>**Grammar:** Articles, prepositions, conjunctions, use of synonyms and antonyms. |
| | |
| **UNIT-III (8 Hrs)** | **Lesson: Stephen Hawking-Positivity'Benchmark'**from*Infotech English*,Maruthi Publications.<br>**Listening:**Listening for global comprehension and summarizing what is listened to both in speaking andwriting.<br>**Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: complaining andapologizing.<br>**Reading:** Reading a text in detail by making basic inferences -recognizing: and interpreting specific context clues; strategies to use text clues for comprehension, criticalreading.<br>**Reading for Writing:** Letter writing- types, format and principles of letter writing, E-mail etiquette, writing a Resume/CV and covering letter.<br>**Vocabulary:** Technical vocabulary from across technical branches (20 words. GRE. Vocabulary 20 words), Idioms & Phrasal verbs, Homonyms, word applications, sequencing of words. |

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|---|---|
| | **Grammar:** Sentence Structures, Transformation of sentences (Active and passive Voice, Degrees of comparison, Simple, Compound and Complex). |
| | |
| **UNIT-IV (8 Hrs)** | **Lesson: Liking a Tree, Unbowed: Wangari Maathai biography**from *Infotech English*, MaruthiPublications.<br>**Listening:** Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.<br>**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.<br>**Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.<br>**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.<br>**Vocabulary:**Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.<br>**Grammar:**Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes. |
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| **UNIT-V (8 Hrs)** | **Lesson: Stay Hungry–Stay Foolish**from *Infotech English*, Maruthi Publications.<br>**Listening:** Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.<br>**Speaking:** Formal oral presentations on topics from academic contexts– with/without the use of PPT slides. Functional English: Suggesting/Opiniongiving.<br>**Reading:** Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.<br>**Reading for Writing:** Report writing, writing academic proposals- writing research articles: format and style.<br>**Vocabulary:** Technical vocabulary from across technical branches (20 words GRE 'Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.<br>**Grammar:** Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses). |
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| **Text Books:** | |
| 1 | *Infotech English*, Maruthi Publications. |
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|---|---|
| **Reference Books:** | |
| 1. | Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge,2014. |
| 2. | Chase. Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT;2nd Edition, 2018. |
| 3. | Skilful Level 2 Reading & Writing Student's Book Pack (B1). Macmillan Educational. |
| 4. | Hewing, Martin. Cambridge Academic English (B2). CUP, 2012. |
| | |
| **E-Resources:** | |
| **Grammar/Listening/Writing** | |
| | 1-language.com |
| | http://www.5minuteenglish.com/ |
| | https://www.englishpractice.com/ |
| **Grammar/Vocabulary** | |
| | English Language Learning Online |
| | http://www.bbc.co.uk/learningenglish/ |
| | http://www.better-english.com/ |
| | http://www.nonstopenglish.com/ |
| | https://www.vocabulary.com/ |
| | BBC Vocabulary Games |
| | Free Rice Vocabulary Game |
| **Reading** | |
| | https://www.usingenglish.com/comprehension/ |
| | https://www.englishclub.com/reading/short-stories.htm |
| | https://www.english-online.at/ |
| **Listening** | |
| | https://learningenglish.voanews.com/z/3613 |
| | http://www.englishmedialab.com/listening.html |
| **Speaking** | |
| | https://www.talkenglish.com/ |
| | BBC Learning English – Pronunciation tips |
| | Merriam-Webster – Perfect pronunciation Exercises |
| **All Skills** | |
| | https://www.englishclub.com/ |
| | http://www.world-english.org/ |
| | http://learnenglish.britishcouncil.org/ |
| | Online Dictionaries |
| | Cambridge dictionary online |
| | MacMillan dictionary |
| | Oxford learner's dictionaries |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20BS1101** | **BS** | **3** | **--** | **--** | **3** | **30** | **70** | **3 Hrs.** |

**MATHEMATICS-I**

**(LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS)**

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

**Pre-requisites:** Calculus of functions of a single variable and Matrices.

**Course Objectives:**Students are expected to learn

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|---|---|
| 1. | Concepts of linear algebra and methods of solution of linear simultaneous algebraicequations. |
| 2. | Eigen values, Eigen vectors and quadratic forms. |
| 3. | First order ordinary differential equations and some simple geometrical and physical applications. |
| 4. | Orthogonal trajectories, Simple electrical circuits and Newton's law of cooling. |
| 5. | Methods of solution of linear higher order ordinary differential equations. |
| 6 | Concepts of Laplace transforms and their applications for solving ODE. |

**Course Outcomes:** At the end of the course the student will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Solve a given system of linear algebraic equations | K3 |
| 2. | Determine Eigen values and Eigen vectors of a system represented by a matrix. | K3 |
| 3. | Solve ordinary differential equations of first order and first degree. | K3 |
| 4. | Applythe knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits | K3 |
| 5. | Solve linear ordinary differential equations of second order and higher order. | K3 |
| 6. | Determine Laplace transform, inverse Laplace transform and solve linear ODE | K3 |

**SYLLABUS**

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|---|---|
| **UNIT-I (10 Hrs)** | **Linear systems of equations:** Rank, Echelon form, Normal form, consistency of system of linear equations, Solution of linear systems by Gauss elimination, Jacobi and Gauss-Seidel methods. |
| **UNIT-II (10 Hrs)** | **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 (10 Hrs)** | **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 (8 Hrs)** | **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. |

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| **UNIT-V (12 Hrs)** | **Laplace transformation:**<br>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).<br>Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms. |
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| **Text Books:** | |
| 1. | B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. |
| 2. | B. V. Ramana,Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education. |
| 3. | N.P.Bali&Manish Goyal, Engineering Mathematics, Lakshmi Publications. |
| | |
| **Reference Books:** | |
| 1. | V. Ravindranath&P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House. |
| 2. | Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India. |
| 3. | Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson. |
| 4. | Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press. |
| 5. | Peter O'Neil, Advanced Engineering Mathematics, Cengage Learning. |
| 6. | Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press. |
| 7. | Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi. |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20BS1103 | BS | 3 | -- | -- | 3 | 30 | 70 | 3Hrs |

**APPLIED CHEMISTRY**

(Common to CSE,ECE &IT)

**Course Objectives:**

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|---|---|
| 1. | To understand the physical and mechanical properties of Polymers/Plastics/elastomers helps in selecting suitable materials for different purpose. |
| 2. | To create awareness on fuels as a source of energy for industries like thermal power stations, steel industry, fertilizer industry etc. |
| 3. | To understand the concept of galvanic cellsand corrosion with theories like electro chemical theory. |
| 4. | To understand the importance of water. |
| 5. | To understand about the materials which are used in major industries like steel and metallurgical manufacturing industries, construction and electrical equipment manufacturing industries. |

**Course Outcomes:**At the end of the course students will be able to

| S.no | Out Come | KL |
|---|---|---|
| 1. | Develop polymer composites, synthetic polymers and formulation of polymers and their use in design | K3 |
| 2. | Apply the knowledge about quality of water and its treatment methods for domestic and industrial applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control. | K3 |
| 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. | K3 |
| 4. | Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage | K2 |

**SYLLABUS**

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|---|---|
| **UNIT-I (10Hrs)** | **High Polymers and Plastics; Rubbers & Elastomers**<br>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,<br>Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers,<br>Biodegradable Polymers - PHBV, Nylon 2, Nylon 6.<br>Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N; |
| **UNIT-II (10Hrs)** | **Energy Sources and Applications:**<br>**Nuclear Energy:** Nuclear fission and Nuclear fusion – Nuclear Power reactor – Applications. Thermal fuels – Introduction – Classification – Calorific value – HCV and |

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| | 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 gasoline, Cetane number of diesel oil, synthetic Petrol; LPG, CNG |
| | |
| **UNIT-III (12Hrs)** | **Electrochemical cells and Corrosion**<br>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; Electrrolessplating ;Paints |
| | |
| **UNIT-IV (8Hrs)** | **Water technology**<br>Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods. |
| | |
| **UNIT-V (10Hrs)** | **Chemistry of Engineering Materials& Advanced Engineering materials**<br>**Cement:-** Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.<br>**Refractories:-** Definition, Characteristics, classification, Properties and failure of refactories.<br>**Solar Energy: -** Construction and working of Photovoltaic cell, applications.<br>**Solid State Materials:** Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.<br>**Liquid Crystals: -** Definition – Classification with examples – Applications |
| | |

| **Text Books:** | |
|---|---|
| 1. | Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing co. |
| 2. | Engineering Chemistry by Willy India Pvt Ltd. |
| 3. | Engineering Chemistry by Dr.K.Anji Reddy and Dr.M.S.R.Reddy ; Silicon Publications. |
| | |
| **Reference Books:** | |
| 1. | Engineering Chemistry by Shikha Aharwal; Cambridge University Press, 2015 edition. |
| 2. | A text of Engineering Chemistry by S.S.Dara; S.Chand& Co Ltd. |
| 3. | Chemistry in Engineering and Technology by JC Kuriacose and J. Rajaram Mc. Graw Hill edition. |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20CS1101 | ES | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |

**PROGRAMMING FOR PROBLEM SOLVING USING C**

(Common to AIDS, CSE, ECE & IT)

**Course Objectives:**

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|---|---|
| 1. | To learn about the computer systems, computing environments, developing of a computer program, Structure of a C Program and to evaluate expressions |
| 2. | To gain knowledge of the operators, selection, control statements and repetition in C |
| 3. | To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage. |
| 4. | To understand the concepts of pointers, dynamic memory allocation and know the significance of Preprocessor. |
| 5. | To learn about various File I/O operations and significance of functions |

**Course Outcomes:** At the end of the course the students will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Apply Precedence and Associativity rules to evaluate Expressions. | K3 |
| 2. | Make use of Decision Making and Looping statements to solve various problems in C | K3 |
| 3. | Illustrate the importance of Arrays and Strings and to apply various operations on them. | K2 |
| 4. | Solve various problems by making use of Structure and Union concepts | K3 |
| 5. | Design and implement programs to analyze the different pointer applications | K3 |
| 6. | Develop programs using Functions and Pointers. | K3 |

**SYLLABUS**

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|---|---|
| **UNIT-I (10 Hrs)** | Introduction to Computers: 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 (10 Hrs)** | 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 (10 Hrs)** | 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. |

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|---|---|
| **UNIT-IV (10 Hrs)** | Pointers: Introduction, Pointers to pointers, Compatibility, L value and R value Pointer Applications: Arrays, and Pointers, Pointer Arithmetic and Arrays, Memory Allocation Function, Array of Pointers, Programming Application. Processor Commands: Processor Commands. |
| | |
| **UNIT-V (10 Hrs)** | Functions: Designing, Structured Programs, Function in C, User Defined Functions, Inter Function Communication, Standard Functions, Passing Array to Functions, Passing Pointers to 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. |
| | |

| **Text Books:** | |
|---|---|
| 1. | Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE |
| 2. | The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson |
| | |
| **Reference Books:** | |
| 1. | Computer Fundamentals and Programming, Sumithabha Das, Mc Graw Hill. |
| 2. | Programming in C, Ashok N. Kamthane, Amit Kamthane, Pearson. |
| 3. | Computer Fundamentals and Programming in C, Pradip Dey, Manas Ghosh, OXFORD. |
| | |
| **e-Resources:** | |
| 1. | https://www.geeksforgeeks.org/c-programming-language/ |
| 2. | https://www.learn-c.org/ |
| 3. | https://www.w3resource.com/c-programming-exercises/ |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20EC1101** | **ES** | **3** | **--** | **--** | **3** | **30** | **70** | **3 Hrs.** |

## BASIC ELECTRONICS

(For ECE)

**Course Objectives:** The students are expected to learn the

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|---|---|
| 1. | Fundamentals on basic circuit components, principles, KVL/KCL analysis, frequency response of RC circuit and measuring instruments. |
| 2. | Principles of semiconductor devices, basic construction, operation & applications of diodes. |
| 3. | Basics of Integrated Circuits (IC) and fundamental operational characteristics of active devices such as BJT, FET. |
| 4. | Number systems and digital circuit elements such as logic gates and flip flops. |

**Course Outcomes:** At the end of the course the student will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Describe the concepts of circuit theory and measuring instruments. | K2 |
| 2. | Explain the basic concepts of semiconductors, drift and diffusion current densities. | K2 |
| 3. | Interpret the structure and operation of various diodes and rectifier circuits. | K3 |
| 4. | Illustrate the characteristics of BJT, FET along with the fabrication process of Monolithic IC. | K3 |
| 5. | Relate the concepts of number systems, logic gates and flip flops. | K2 |

## SYLLABUS

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|---|---|
| **UNIT-I (10 Hrs)** | **Basic Circuit Theory & Measuring Instruments:** Independent DC & AC sources, Passive and active circuit components, Resistors, Inductors, Capacitors, V-I relationships, Series and parallel connections, Resistance, Reactance, Impedance, KVL, KCL, Concept of charging and discharging, Frequency response of a 1st order RC circuit. Basics of Voltmeter, Ammeter and Multimeter, Basics of CRO: Functional block diagram, Operation, Measurement of voltage and current amplitude along with frequency. |
| **UNIT-II (10 Hrs)** | **Semiconductor Materials and Properties:** Energy band theory of solids, Classification of Materials, Fermi-level, Intrinsic and Extrinsic semiconductors, P-type and N-type semiconductors, Mobility and conductivity, Dependence of conductivity on temperature, Charge densities, Drift and diffusion currents and their densities, Hall effect. |
| **UNIT-III (10 Hrs)** | **Fundamentals of P-N Junction Diode and Special Diodes:** Elementary concepts, Forward and reverse biased P-N junction, V-I characteristics, Linear piecewise model, DC load line, Applications of PN junction diode, Varactor diode, Zener diode, LED, Photo diode. **Diode as a Rectifier:** Half wave, Full wave rectifiers, PIV, DC voltage and current, Ripple factor, Efficiency, Capacitor filter, Zener diode as a voltage regulator. |

| | |
|---|---|
| **UNIT-IV (10 Hrs)** | **Fundamentals of Transistors and Integrated Circuits (IC):**<br>Bipolar Junction Transistor (BJT) construction and Basic operation, Active, Cut-off, Saturation modes of operation, CB, CE and CC configurations, Input and Output characteristics, Early effect, Transistor as an Amplifier and a Switch, Comparison of three configurations, Advantages of FET over BJT, Junction-Field Effect Transistor (JFET) Operation,<br>Introduction to Integrated Circuits: Classification of ICs and Fabrication of Monolithic ICs. |
| | |
| **UNIT-V (10 Hrs)** | **Digital Electronics (Introductory level only)**<br>Difference between analog and digital signals, Number Systems: Binary, Decimal, Octal, Hexa-Decimal number systems and Conversions among them, Logic Gates: AND, OR, NOT, XOR, NAND and NOR; Half and Full adder/subtractor, Latches and Flip Flops: SR, JK, T, D flip-flops. |
| | |
| **Text Books:** | |
| 1. | Electronic Devices and Circuits Theory by Robert L. Boylestad& Louis Nashelsky, PHI edition |
| 2. | Electronic Devices and Circuits: An Introduction, Alan Mottershead, PHI Edition. |
| | |
| **Reference Books:** | |
| 1. | Basic Electronics by Bernard Grob, 4th edition, International Student edition, MCGraw Hill publishers. |
| 2. | Electronic Devices and Circuits by SanjeevGuptha, DhanpatRai publications. |
| 3. | Electronic Principles, Albert Paul Malvino. |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20CS1103 | ES | 0 | 0 | 3 | 1.5 | 15 | 35 | 3 Hrs. |

**PROGRAMMING FOR PROBLEM SOLVING USING C LAB**

(Common to AIDS, CSE, ECE & IT)

**Course Objectives:**

| | |
|---|---|
| 1. | Apply the principles of C language in problem solving. |
| 2. | To design & develop of C programs using Arrays, Strings, Structures, Unions and Pointers |
| 3. | To perform the file operations, preprocessor commands |
| 4. | To solve various complex problem by applying modular programming skills |

**Course Outcomes:** At the end of the course students will be able to

| S.No | Out Come | KL |
|---|---|---|
| 1. | Write, Trace and Debug the programs and correct syntax and logical errors. | K4 |
| 2. | Solve various Problems by making use of Arrays, Strings, Structures, Unions and Pointers | K3 |
| 3. | Solve a complex problem by decomposing into several modules by using Functions | K4 |
| 4. | Apply various File I/O operations | K3 |

**LIST OF PROGRAMS**

| | |
|---|---|
| 1 | Exercise 1:<br>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.<br>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.<br>3. Write a C program to display multiple variables. |
| 2 | Exercise 2:<br>1. Write a C program to calculate the distance between the two points.<br>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". |
| 3 | Exercise 3:<br>1. Write a C program to convert a string to a long integer.<br>2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.<br>3. Write a C program to calculate the factorial of a given number. |
| 4 | Exercise 4:<br>1. Write a program in C to display the n terms of even natural number and their sum.<br>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.<br>3. Write a C program to check whether a given number is an Armstrong number or not. |
| 5 | Exercise 5:<br>1. Write a program in C to print all unique elements in an array.<br>2. Write a program in C to separate odd and even integers in separate arrays.<br>3. Write a program in C to sort elements of array in ascending order. |

| | |
|---|---|
| 6 | Exercise 6:<br>1. Write a program in C for multiplication of two square Matrices.<br>2. Write a program in C to find transpose of a given matrix. |
| 7 | Exercise 7:<br>1. Write a program in C to search an element in a row wise and column wise sorted matrix.<br>2. Write a program in C to print individual characters of string in reverse order. |
| 8 | Exercise 8:<br>1. Write a program in C to compare two strings without using string library functions.<br>2. Write a program in C to copy one string to another string. |
| 9 | Exercise 9:<br>1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation<br>2. Write a program in C to demonstrate how to handle the pointers in the program. |
| 10 | Exercise 10:<br>1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.<br>2. Write a program in C to add two numbers using pointers |
| 11 | Exercise 11:<br>1. Write a program in C to add numbers using call by reference.<br>2. Write a program in C to find the largest element using Dynamic Memory Allocation |
| 12 | Exercise 12:<br>1. Write a program in C to swap elements using call by reference.<br>2. Write a program in C to count the number of vowels and consonants in a string using a pointer. |
| 13 | Exercise 13:<br>1. Write a program in C to show how a function returning pointer.<br>2. 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:<br>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<br>2. Write a program in C to convert decimal number to binary number using the function. |
| 15 | Exercise 15:<br>1. Write a program in C to check whether a number is a prime number or not using the function.<br>2. Write a program in C to get the largest element of an array using the function. |
| 16. | Exercise 16:<br>1. Write a program in C to append multiple lines at the end of a text file.<br>2. Write a program in C to copy a file in another name.<br>3. Write a program in C to remove a file from the disk. |
| | |
| **Reference Books:** | |
| 1. | Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE |
| 2. | The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson |
| | |
| **e-Resources:** | |
| 1. | https://www.geeksforgeeks.org/c-programming-language/ |
| 2. | https://www.learn-c.org/ |
| 3. | https://www.tutorialspoint.com/cprogramming/index.html |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20BS1108 | BS | -- | -- | 3 | 1.5 | 15 | 35 | 3Hrs |

## APPLIED CHEMISTRY LAB

(Common to CSE,ECE &IT)

**Course Objectives:**

| | |
|---|---|
| 1. | To investigate and understand Physical behaviour in the laboratory using scientific reasoning and logic and interpret the result of simple experiments and demonstration of chemical Principle and also evaluate the impact of chemical discoveries on how we view the world. |
| 2. | Effectively communicate experimental results and solutions to application problems through oral and written reports. |
| 3. | Recognize the classical ideas and chemical phenomena and also define and analyse the concepts. |

**Course Outcomes:**At the end of the course students will be able to

| S.No | Out Come | KL |
|---|---|---|
| 1. | Gain technical knowledge of measuring, operating and testing of chemical instruments and equipments. Carrying out different types of chemical reactions for analysing different materials in micro level quantities. | K3 |
| 2. | Analyze and generate experimental skills to enhance the analytical thinking capabilities in the modern trends in engineering and technology. | K3 |

## LIST OF PROGRAMS

| | |
|---|---|
| 1 | Determination of Alkalinity of water sample. |
| 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 of water and soil sample. |
| 8 | Determination of Chlorides present in water sample. |
| 9 | Conductometric titration of strong acid Vs strong base. |
| 10 | Potentiometric titration of strong acid Vs strong base. |
| 11 | Potentiometric titration of strong acid Vs weak base. |
| 12 | Preparation of Phenol formaldehyde resin. |
| 13 | Determination of saponification value of oils. |
| 14 | Determination of pour and cloud points of lubricating oil. |
| 15 | Determination of Acid value of oil. |

**Reference Books:**


| | |
|---|---|
| 1. | Engineering Chemistry Lab Manual Prepared by Chemistry Faculty of S.R.K.R.EngineeringCollege. |
| 2. | Laboratory manual on Engineering Chemistry by Dr.Sudha Rani; Dhanpat Rai Publishing Company. |
| 3. | Engineering Chemistry Laboratory manual – I & II by Dr.K.Anji Reddy; Tulip Publications. |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20EC1102 | ES | -- | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. |

**ELECTRONICS WORKSHOP**

(For ECE)

**Course Objectives:**

| | |
|---|---|
| 1. | This course gives a basic introduction of electronic hardware systems and provides hands-on training with familiarization, identification, testing, assembling, and dismantling. |
| 2. | To learn fabrication and repairing such systems by making use of the various tools and instruments available in the Electronics Workshop. |
| 3. | Students are expected to get familiarity with PC Hardware/Software issues and the usage of EDA/System Design Educational tools such as PSPICE, MATLAB & Arduino/Raspberry Pi boards. |

**Course Outcomes:** The student should be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Identify electronic components like resistors, capacitors, diodes, transistors etc. | K1 |
| 2. | Use measuring instruments and equipment such as multimeter, function generator, power supply and CRO. Assemble circuits on a breadboard, analyze the performance of the circuits, evaluate the results and confirm the validity of established concepts. | K3 |
| 3. | Describe the PCB fabrication process, Solder and de-solder components on PCB. | K2 |
| 4. | Use EDA/System tools such as PSPICE and MATLAB | K3 |
| 5. | Examine the PC Hardware,Software and Arduino/Raspberry Pi boards | K2 |

**LIST OF EXPERIMENTS**

| | |
|---|---|
| **I** | **Components Identification and Testing:** |
| | A. Identify, understand, and draw the different circuit components and symbols used in Electronics labs. |
| | B. Resistance value using color code. |
| | C. Breadboard 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:<br>(i) Artwork & printing of a simple PCB.<br>(ii)Etching & Drilling of PCB |
| **IV** | **Introduction to Technical Software and Tools:** |
| | A. EDA Tools: PSPICE demo |
| | B. MATLAB Introduction: Demo, Signals & Plotting |
| | C. Google Docs, Sheets, Slides and Forms for Documentation and Collaboration |

| | |
|---|---|
| **V** | **Personal Computer (PC) and Electronic Hardware Boards:** |
| | A. Study of PC Hardware |
| | B. PC Software installation (OS and Compilers) |
| | C. Basics and Demonstration of Arduino and Raspberry Pi boards |
| | |
| **References:** | |
| 1 | Lab Manual |
| 2 | David A Bell, “Fundamentals of Electronic Devices and Circuits lab manual", 5th Edition, Oxford University Press 2008. |
| | |
| **e- Resources:** | |
| 1 | https://www.mathworks.com/products/matlab.html |

| Regulation: R20 | I / IV - B.Tech. II - Semester |
|---|---|

**ELECTRONICS & COMMUNICATION ENGINEERING**

**SCHEME OF INSTRUCTION & EXAMINATION**
**(With effect from 2020-21 admitted Batch onwards)**

| Course Code | Course Name | Category | Cr | L | T | P | Int. Marks | Ext. Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| B20 BS 1201 | Mathematics-II | BS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 BS 1202 | Applied Physics | BS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 EE 1201 | Basic Electrical Engineering | BS | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 ME 1203 | Engineering Drawing | ES | 3 | 2 | 0 | 2 | 30 | 70 | 100 |
| B20 EE 1202 | Network Analysis | ES | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 BS 1207 | Applied Physics Lab | BS | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 HS 1202 | Communication Skills Lab | HS | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 EE 1204 | Basics Electrical Engineering Lab | ES | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 MC 1202 | Professional Ethics and Human Values | MC | 0 | 2 | 0 | 0 | -- | -- | -- |
| B20 MC 1203 | National Service Scheme (NSS) | MC | 0 | 0 | 0 | 2 | -- | -- | -- |
| | | **TOTAL** | **19.5** | **16** | **0** | **13** | **195** | **455** | **650** |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20BS1201** | **BS** | **3** | **--** | **--** | **3** | **30** | **70** | **3 Hrs.** |

**MATHEMATICS – II**

**(FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS)**

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

**Prerequisites:**Calculus of functions of a single variable and Geometry

**Course Objectives: S**tudents are expected to learn:

| | |
|---|---|
| 1. | How to expand an aperiodic function in a Fourier series. |
| 2. | How to find Fourier transform for a given function and evaluate some real definite integrals. |
| 3. | Application of partial differentiation for determining maxima/ minima of functions. |
| 4. | Evaluation of real definite integrals. |
| 5. | Formation and solution of linear partial differential equations |
| 6. | Solution of one-dimensional wave equation and one-dimensional heat equation by the method of separation of variables. |

**Course Outcomes:** At the end of the course students will be able to

| S. No | Outcome | KL |
|---|---|---|
| 1. | DetermineFourier series and half range series of functions | K3 |
| 2. | Determine Fouriertransforms of non-periodic functions and also use them to evaluate integrals. | K3 |
| 3. | Compute partial derivatives, total derivative and Jacobians. | K3 |
| 4. | Find maxima/minima of functions of two variables and evaluate some real definite integrals. | K3 |
| 5. | Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs. | K3 |
| 6. | Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation | K3 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (10 Hrs)** | **Fourier Series**<br>Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Change of interval.<br>Even and odd functions, Half-range sine and cosine series. |
| **UNIT-II (12 Hrs)** | **Fourier Transforms**<br>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 (10 Hrs)** | **Partial differentiation:**<br>Introduction, Homogeneous functions, Euler's theorem, Chain rule, Total derivative, Jacobians and their properties.<br>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 (10 Hrs)** | **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 (10 Hrs)** | **Applications of partial differential equations:** Method of separation of variables, One –dimensional wave equation, the D'Alembert's solution, one- dimensional heat equation |
| | |

| **Text Books:** | |
|---|---|
| 1. | B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. |
| 2. | N.P.Bali& Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications. |
| 3. | B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education. |
| **Reference Books:** | |
| 1. | Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press. |
| 2. | V.Ravindranath and P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House. |
| 3. | Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India. |
| 4. | David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3rd Edition, Universities Press. |
| 5. | Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press. |
| 6. | Dass H.K., RajnishVerma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi. |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20BS1202** | **BS** | **3** | **--** | **--** | **3** | **30** | **70** | **3 Hrs.** |

**APPLIED PHYSICS**

(Common to CSE, ECE &IT)

**Course Objectives:**

| | |
|---|---|
| 1. | **Impart** the knowledge in basic concepts of wave optics through the Phenomena of interference and diffraction, basic concepts and properties of dielectric and magnetic materials and semiconductors. |
| 2. | **Familiarize** the student with modern technologies like lasers, optical fibers and ultrasonics with an understanding of the science behind. |
| 3. | **Impart** the elementary concepts of nanomaterials and their significance in different engineering branches. |

**Course Outcomes:**At the end of the course the student will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | **Interpret** the behavior of light radiation in interference and diffraction Phenomena and their applications. | K3 |
| 2. | **Explain** the classification and properties of dielectric and magnetic materials suitable for engineering applications. | K3 |
| 3. | **Understand** the basics of modern optical technologies like lasers and optical fibers and their utility in various fields. | K3 |
| 4. | **Explain** the important aspects of semiconductors and electrical conductivity in them. | K3 |
| 5. | **Understand** the basics of technology of Ultrasonics in various fields and demonstrate the synthesis and applications of nanomaterials. | K3 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (10 Hrs)** | **WAVE OPTICS**<br>**Interference:** Principle of super position. Interference of light, interference in thin films (reflected light) – Wedge film and Newton`s rings – Applications<br>**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 |
| **UNIT-II (10 Hrs)** | **DIELECTRICS AND MAGNETICS**<br>**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.<br>**Magnetics**: Introduction to magnetics, Magnetic dipole moment , Magnetization, Magnetic susceptibility and Permeability, Origin of permanent magnetic moment, Classification of magnetic materials ( Dia , Para, Ferro, Antiferro and ferri), Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications. |

| | |
|---|---|
| **UNIT-III (10 Hrs)** | **LASERS AND FIBER OPTICS**<br>**Lasers**: Introduction, Interaction of 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.<br>**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 (9 Hrs)** | **SEMICONDUCTORS**<br>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 (9 Hrs)** | **ULTRASONICS AND NANOMATERIALS**<br>**Ultrasonics:** Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating - determination of wavelength and velocity of ultrasonics, applications of ultrasonics.<br>**Nanomaterials:** Introduction, salient features of Nanomaterials, Synthesis methods – Ball milling, Condensation, Chemical Vapour Deposition and Sol – Gel methods, Characterization techniques for nano materials - The scanning tunneling microscopy (STM) and The atomic force microscopy (AFM), Carbon nanotubes (CNTS), Applications of Nano materials. |
| | |

| **Text Books:** | |
|---|---|
| 1. | A text Book of Engineering Physics – M.N. Avadhanulu and P.G.Kshirasagar.-S.Chand Publications 2017 |
| 2. | Engineering Physics by HK Malik and A.K.Singh. McGrawhill Publishing Company Ltd. |
| 3. | Engineering Physics by V.Rajendran. McGrawhill Education (India)Pvt Ltd. |
| | |
| **Reference Books:** | |
| 1. | Introduction to Solid State Physics by Charles Kittel , Wiley Publications 2011 |
| 2. | Semiconductors Devices – Physics and Technology by S.M.Sze , Wiley Publications 2008 |
| 3. | Text book of Nano Science and Nano technology by TataMcGrawhill 2013. |
| 4. | Optical fiber communications by Gerd Keiser, Tata McGraw hill 2008. |
| | |
| **e-Resources:** | |
| 1. | http://library.iiti.ac.in/ |
| 2. | https://onlinecourses.nptel.ac.in/ |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20EE1201** | **ES** | **3** | **--** | **--** | **3** | **30** | **70** | **3 Hrs.** |

**BASIC ELECTRICAL ENGINEERING**

(for ECE)

**Course Objectives:**

| | |
|---|---|
| 1. | To understand the principle of operation, constructional details and operational characteristics of DC generators. |
| 2. | To teach AC electrical circuit analysis. |
| 3. | To explain working principles of transformers. |
| 4. | To learn the principle of operation, constructional details, performance, torque – slip characteristics of 3-phase induction motors. |
| 5. | To study the principle of operation and construction details of synchronous generators. |

**Course Outcomes:** After completion of the course, the student will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | **Explain** the principle of operation of DC machines and analyze their characteristics. Acquire the skills to analyze the speed control methods of DC motors. | K4 |
| 2. | **Analyze** single-phase AC circuits consisting of series RL - RC - RLC combinations. | K4 |
| 3. | **Explain** the operation of single-phase transformer. | K3 |
| 4. | **Analyze** the slip – torque characteristics of a 3-phase induction motor. | K4 |
| 5. | **Explain** the operation of synchronous generators. | K3 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (10- Hrs.)** | **D.C Machines:** Principle of operation and construction of DC generator – EMF equation – types of DC machines – OCC of DC shunt generator - Torque equation of DC motor - applications – losses and efficiency - Brake test- Swinburne's test - speed control of DC shunt motor- Simple Problems. |
| **UNIT-II (10- Hrs.)** | **Introduction to AC Circuits:** Representation of sinusoidal waveforms - Peak, Average and RMS values - Phasor representation - power factor - Analysis of single-phase ac circuits consisting of pure resistor, pure inductor, pure capacitor, R-L, R-C, RLC series circuits-instantaneous power-real power - reactive power - apparent power. |
| **UNIT-III (10- Hrs.)** | **Transformers:** Principle of operation of Single-Phase Transformer – EMF equation - Losses and efficiency of transformer- Regulation of transformer- OC and SC tests on single phase transformer- Predetermination of efficiency and regulation -Simple Problems. |
| **UNIT-IV (10- Hrs.)** | **Induction Machines:** Principle of operation and construction of three phase Induction Motors- slip ring and squirrel cage motors-Torque Equation - Torque-Slip Characteristics- Brake test on three phase Induction motor- Simple Problems. |

| | |
|---|---|
| **UNIT-V (10- Hrs.)** | **Synchronous Machines:** Principle of operation and construction of Alternators –Types of Alternators-EMF equation of three phase Alternator - Regulation of Alternator by Synchronous impedance method. Principle of operation and construction of Synchronous Motor- Starting methods of Synchronous motor. |
| | |
| **Text Books:** | |
| 1. | Engineering Circuit Analysis, William H.Hayt Jr. and Jack E. Kemmerley, 5th Edition, McGraw Hill International Edition. |
| 2. | Electrical Machinery by Dr. P.S BIMBRA, 7th Edition, Khanna publications |
| 3. | Principles of Electrical Machines by V.K. Mehta & Rohit Mehta, S.Chand publications |
| 4. | Theory & performance of Electrical Machines by J.B.Guptha, S.K.Kataria& Sons. |
| 5. | Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications |
| | |
| **Reference Books:** | |
| 1. | Fundamentals of Electric circuits 5th edition Charles K. Alexander and Matthew Sadiku. |
| 2. | Basic Electrical Engineering by Nagsarkar,Sukhija, Oxford Publications,2nd edition |
| 3. | Electrical Technology by Surinder Pal Bali, Pearson Publications.January 1, 2013 |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20ME1203 | ES | 2 | -- | 2 | 3 | 30 | 70 | 3 Hrs |

**ENGINEERING DRAWING**

(For ECE)

**Course Objectives:**

| | |
|---|---|
| 1. | To bring awareness that Engineering drawing is the language of engineers |
| 2. | To impart basic knowledge and skills required to prepare Engineering drawings. |
| 3. | To develop the Engineering imagination essential for successful design. |

**Course Outcomes:** At the end of the course, the students will be able to

| S.No | Outcomes | KL |
|---|---|---|
| 1. | Apply principles of drawing to Construct polygons and engineering curves. | K3 |
| 2. | Apply principles of Orthographic projections to draw the projections of points and lines. | K3 |
| 3. | Apply principles of drawing to draw the projections of planes. | K3 |
| 4. | Apply principles of drawing to draw projections of solids and their sectional views. | K3 |
| 5. | Apply principles of drawing to draw developments and pictorial view of solids. | K3 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (8Hrs)** | **Geometrical Constructions and Engineering Curves:** Introduction to Engineering Drawing, Geometrical Constructions, Engineering Curves: Parabola, Ellipse and Hyperbola by general method (Eccentricity method only), cycloid, epicycloid, hypocycloid, involutes, tangent & normal for these curves. |
| | |
| **UNIT-II (8Hrs)** | **Orthographic Projections:** Introduction to orthographic projection, projections of points in various quadrants, projections of lines: lines perpendicular to one of the reference planes (HP,VP or PP), Projections of straight lines inclined to one reference plane and parallel to other, Projections of straight lines inclined to both the planes. |
| | |
| **UNIT-III (8Hrs)** | **Projections of planes**: Regular planes perpendicular to one reference plane and parallel to other, planes perpendicular to one reference plane and inclined to the other reference plane; planes inclined to both the reference planes. |
| | |
| **UNIT-IV (8Hrs)** | **Projections of Solids:** – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes.<br>**Sections of Solids:** Sections and Sectional views of Right and Regular Solids – Prism, Cylinder, Pyramid and Cone – Auxiliary views. |
| | |
| **UNIT-V (8Hrs)** | **Development of Solids:** Development of Surfaces of Right and Regular Solids – Prism, Cylinder, Pyramid and Cone.<br>**Isometric Projection:** Introduction to Isometric projection and Isometric projection of simple Right and Regular Solids – Prism, Cylinder, Pyramid and Cone. |

**Text Books:**

| | |
|---|---|
| 1. | Engineering Drawing by N.D Bhatt, Charotar Publications. |
| 2. | Engineering Drawing by Agarwal &Agarwal, Tata McGraw Hill Publishers |

| **Reference Books:** | |
|---|---|
| 1. | Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers. |
| 2. | Engineering Graphics for Degree by K.C. John, PHI Publishers. |
| 3. | Engineering Graphics by PI Varghese, McGrawHill Publishers. |
| 4. | Engineering Drawing– K Venugopal, V. Prabhu Raja, New Age |
| | |
| **e-Resources:** | |
| 1. | https://nptel.ac.in/courses/112103019/ |
| 2. | https://nptel.ac.in/courses/112104172/1 |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20EE1202 | ES | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |

## NETWORK ANALYSIS

(For ECE)

**Course Objectives:**

| | |
|---|---|
| 1. | To introduce basics of electric circuits and learn various theorems. |
| 2. | To learn the steady state and transient behaviour of RL, RC and RLC circuits. |
| 3. | To learn the concepts of AC networks and sinusoidal steady state behaviour of RLC circuits. |
| 4. | To understand the concept of two port networks. |
| 5. | To learn the properties of network functions and their properties. |

**Course Outcomes:** After completion of the course, the student will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Apply concepts of Kirchhoff's laws, Network reduction Techniques for solving DC circuits and apply various network theorems to analyze the various electric circuits. | K3 |
| 2. | Learn the behavior of energy storage elements (inductance and capacitance) in electric circuits and analyze transient and steady state response. | K4 |
| 3. | Analyze the RLC circuits in sinusoidal steady state. | K4 |
| 4. | Determine two port network parameters. | K3 |
| 5. | Determine network function, poles-zeros and stability of network function. | K3 |

## SYLLABUS

| | |
|---|---|
| **UNIT-I (10- Hrs.)** | **DC CIRCUITS AND THEOREMS:**<br>Electrical circuit elements (R - L and C), Types of sources- Ohm's Law- Kirchhoff laws – Network reduction techniques (series, parallel, series-parallel and Star-Delta Transformations), Source transformation, Mesh analysis and nodal analysis.<br>Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem- Problems using dependent sources also. |
| **UNIT-II (10- Hrs.)** | **DC TRANSIENTS:**<br>Inductor, Capacitor, Source free RL, RC and RLC response, Evaluation of Initial conditions, Application of unit step function to RL, RC and RLC circuits, Concept of Natural, Forced and Complete response. |
| **UNIT-III (10- Hrs.)** | **ANALYSIS OF AC NETWORKS AND RESONANCE:**<br>Review of AC circuits, Mesh analysis and nodal analysis, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem.<br>Series and Parallel resonance, selectivity, bandwidth and quality factor. |
| **UNIT-IV (10- Hrs.)** | **TWO-PORT NETWORKS:**<br>Introduction, Z-parameters, Y-parameters, ABCD-parameters, h-parameters, Relationship between various parameters, series, parallel & cascaded connection of two port network. |

| | |
|---|---|
| **UNIT-V (10- Hrs.)** | **NETWORK FUNCTIONS:** Network functions for single port and two port, calculation of network functions for ladder and general networks, Transfer function, poles and zeros, restriction of poles and zeros for driving point and transfer function, time domain behaviour of poles and zeros for driving point and transfer function, Time domain behaviour from pole-zero plot, Routh-Hurwitz criterion of stability of network function. |
| | |
| **Text Books:** | |
| 1. | Engineering Circuit Analysis, William H.Hayt Jr. and Jack E. Kemmerley, 5th Edition, McGraw Hill International Edition. |
| 2. | Fundementals of Electric Circuits,Charles, K. Alexander and Matthew Sadiku, 5thedition.McGraw-Hill Education. |
| 3. | Network Analysis and Synthesis, M.E.VanValkenburg, 3rdedition,PHI. |
| 4. | Electric Circuit Analysis ,K.S.Suresh Kumar, 1st Edition, Pearson. |
| | |
| **Reference Books:** | |
| 1. | Circuit Theory Analysis and Synthesis, AbijithChakrabarthi, DhanpatRai&Co, edition 2014. |
| 2. | Network Analysis and Synthesis, Franklin F Kuo, 2nd edition, Jhon Wiley & Sons Inc. |
| 3. | Network Analysis, A Sudhakar, Shyammohan. S. Palli, 3rd Edition, Tata McGraw Hill Education PVT Ltd. |
| 4. | Theory and Problems of Electric Circuits, MohmoodNahvi, Joseph A. Edminister,Schaum's outline series, 4th Edition, McGraw Hill. |
| | |
| **e-Resources:** | |
| 1. | https://www.pdfdrive.com/electrical-circuit-theory-and-technology-third-edition-electrical-circuit-theory-and-technology-d162459767.html |
| 2. | https://www.pdfdrive.com/circuit-theory-and-networks-e158545493.html |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20BS1207 | BS | -- | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. |

**APPLIED PHYSICS LAB**

(Common to CSE,ECE &IT)

**Course Objectives:**

| | |
|---|---|
| 1. | To impart hands-on experience to the students entering engineering / Technology education about handling sophisticated equipment / instruments. |
| 2. | To make the students understand the theoretical aspects of various phenomena experimentally. |

**Course Outcomes:**At the end of the course students willbe able to

| S.No | Out Come | KL |
|---|---|---|
| 1. | Get hands on experience in setting up experiments and using the instruments / equipment individually. | K3 |
| 2. | Get introduced to using new / advanced technologies and understand their significance. | K3 |

**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 | To study the characteristics of PN Junction diode |
| 8 | To determine the Numerical aperture of a given optical fiber and hence to find its acceptance angle. |
| 9 | Determination of Planck constant |
| 10 | Determination of the Rigidity modulus of elasticity of a material – Torsional pendulum. |
| 11 | Verification of the laws of vibrations in stretched stings - Sonometer. |
| 12 | Determination of the frequency of the AC supply – AC Sonometer. |
| 13 | To determine refractive indices (μo and μe) of a birefringent material (prism). |

**Reference Books:**


| | |
|---|---|
| 1. | Advanced Practical Physics Vol 1& 2 SP Singh & M.S Chauhan Pragati Prakashan ,Meerut |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20HS1202 | HS | -- | -- | 3 | 1.5 | 15 | 35 | 3Hrs |

**COMMUNICATION SKILLS LAB**

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

**Course Objectives:**

| | |
|---|---|
| 1. | To expose to a variety of self-instructional, learner-friendly modes of languagelearning. |
| 2. | To familiarize the students with CALL (Computer Assisted Language Learning). Thus, providing them with the required facility to face computer-based competitive exams like GRE,TOEFL, GMAT etc. |
| 3. | To equip the students with necessary professional communication. |
| 4. | To build confidence in LSRW Skills. |
| 5. | To adapt the students by adopting the techniques of effective communication skills. |

**Course Outcomes:** At the end of the course students will be able to

| S.No | Out Come | KL |
|---|---|---|
| 1. | Apply their linguistic competence in all LSRW skills to professional and personal settings. | K3 |
| 2. | Apply communication skills learnt through various language learning activities to their advancement in academics and competitive examinations. | K3 |
| 3. | Draft job application letters, E-Mail messages and other writing discourses. | K3 |
| 4. | Adopt professional etiquette consistent with formal settings. | K3 |
| 5. | Improve fluency and clarity in both spoken and written English. | K3 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I** | A list of communicative expressions<br>(Requests, Permissions, Asking/ giving directions, Thanking and Responding to Thanks, Clarifying, Inviting, Congratulating, Advising, Agreeing and disagreeing etc.,)<br>Common Errors |
| **UNIT-II** | Pronunciation Letters and Sounds<br>The Sounds of English<br>Stress and Intonation<br>Phonetic Transcription |
| **UNIT-III** | Group Discussions |
| **UNIT-IV** | Presentation Skills |
| **UNIT-V** | Interview Skills<br>Resume/ Curriculum Vitae<br>Covering Letter<br>FAQ's<br>Telephonic Interviews/ Etiquette<br>Mock Interviews |

| | |
|---|---|
| **Text Books:** | |
| 1. | Interact – English Lab Manual for Undergraduate Students – Orient BlackSwan |
| | |
| **Reference Books:** | |
| 1. | Exercises in Spoken English Part 1,2,3,4, OUP and CIEFI. |
| 2. | English Pronunciation in use- Mark Hancock, CUP. |
| 3. | English Pronunciation in use- Mark Hewings, CUP. |
| 4. | English Pronunciation Dictionary- Daniel Jones, CUP. |
| 5. | English Phonetics for Indian Students- P. BalaSubramanian, Mac MillanPublications |
| 6. | Technical Communication- Meenakshi Raman, Sangeeta Sharma, OUP. |
| 7. | Technical Communication- Gajendra Singh Chauhan, SmitaKashiramka, cengage Publications |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20EE1204 | ES | -- | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. |

**BASIC ELECTRICAL ENGINEERING LAB**

(For ECE)

**Course Objectives:**

| | |
|---|---|
| 1. | To know about basic electrical laws |
| 2. | To study the parameters of inductor. |
| 3. | To plot the magnetizing characteristics of DC shunt generator and understand the mechanism of self-excitation. |
| 4. | To control the speed of DC motors. |
| 5. | To predetermine the efficiency and regulation of transformers and assess their performance. |
| 6. | To study the performance of three phase induction motor |

**Course Outcomes:**At the end of the course students will be able to

| S.No | Outcome | KL |
|---|---|---|
| 1. | Verify ohms law and Kirchhoff's laws for a given circuit | K4 |
| 2. | Determine the parameters of iron core inductor | K4 |
| 3. | Predetermine the performance of DC machines and transformers. | K4 |
| 4. | Make use of DC shunt machines for applications. | K4 |
| 5. | Perform brake test on 3-phase induction motor. | K4 |

**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. |

**Reference Books:**


| | |
|---|---|
| 1. | Basic Electrical Engineering by Ritusahdev, Khanna book publishing, 2018 edition. |
| 2. | Principles of Electrical Machines by V.K. Mehta & Rohit Mehta, S.Chandpublicatio |
| 3. | Electrical Technology by Surinder Pal Bali, Pearson Publications.January 1, 2013 |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| B20MC1202 | MC | 2 | -- | -- | 0 | -- | -- | -- |

**PROFESSIONAL ETHICS AND HUMAN VALUES**

(Common to CSE, ECE & IT)

**Course Objectives:**

| | |
|---|---|
| 1 | To create an awareness on Engineering Ethics and Human Values. |
| 2 | To instill Moral and Social Values and Loyalty. |
| 3 | To appreciate the rights of others. |
| 4 | To create awareness on assessment of safety and risk. |

| | | |
|---|---|---|
| **Course Outcomes:** | At the end of the course students will be able to: | **K L** |
| 1 | Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work. | K1&K2 |
| 2 | Identifythemultipleethicalinterestsatstakeinareal-worldsituationorpractice and Articulatewhat makesaparticularcourseofactionethicallydefensible. | K1&K2 |
| 3 | Assess their own ethical values and the social context of problems. | K3 |
| 4 | Identify ethical concerns in research and intellectual contexts, including academic integrity,useandcitationofsources,theobjectivepresentationofdata,andthetreatment of humansubjects. | K3 |
| 5 | Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research. | K4 |

**SYLLABUS**

| | |
|---|---|
| **UNIT-I (10 Hrs)** | **Human Values:** Morals,ValuesandEthics-Integrity-WorkEthic-ServicelearningCivicVirtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence CharacterSpirituality. |
| **UNIT-II (10 Hrs)** | **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 (8 Hrs)** | **Engineering as Social Experimentation:** Engineering As SocialExperimentation- Framing the problem- Determiningthefacts codesofEthics- ClarifyingConcepts- Application issues Common Ground -General Principles- Utilitarian thinking respect forpersons. |
| **UNIT-IV (10 Hrs)** | **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 (10Hrs)** | **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. |
| | |
| **Text Books:** | |
| 1. | "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan- and, V.S.Senthil Kumar-PHI Learning Pvt Ltd-2009. |
| 2. | "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009. |
| 3. | "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger-Tata McGraw-Hill-2003. |
| 4. | "Professional Ethics and Morals" by Prof.A.R.Aryasri, DhanikotaSuyodhana-Maruthi Publications. |
| 5. | "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran-LaxmiPublications. |
| 6. | "Professional Ethics and Human Values" by Prof.D.R.Kiran |
| 7. | "Indian Culture, Values and Professional Ethics" by PSR Murthy- BS Publication. |
| 8. | Professional Ethics by R.Subramaniam - Oxford publications, New Delhi. |

| Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|---|---|---|
| **B20MC1203** | **MC** | **--** | **--** | **2** | **--** | **--** | **--** | **--** |

**NATIONAL SERVICE SCHEME(NSS)**

(Common to All Branches)

**Course Objectives:**

| | |
|---|---|
| 1. | To understand the community and understand themselves in relation to their community. |
| 2. | Identify the needs and problems of the community and involve them in problem solving process. |
| 3. | Utilize their knowledge for finding practical solution to individual and community problems. |

**Course Outcomes: Student will be able to**

| S.No | | Knowledge Level |
|---|---|---|
| 1. | **understand** general orientation about community service, voluntarism role and responsibility of NSS volunteer. | K2 |
| 2. | **Analyze** about the community he live in. | K4 |
| 3. | **Asses** the life in adopted villages. | K5 |
| 4. | **Identify** the importance of national days and attain participation in it. | K3 |

**SYLLABUS**

| | |
|---|---|
| 1. | Volunteerism- community and beyond(Theory). |
| 2. | Role and responsibility of NSS volunteer (Theory). |
| 3. | General orientation about community service(Theory). |
| 4. | Arranging lectures on social issues in schools or villages(Theory). |
| 5. | Arranging rally's on social issues. |
| 6. | Socio economic survey in adopted villages |
| 7. | Plantation of saplings. |
| 8. | Blood donation camp |
| 9. | Rainwater harvesting awareness camp. |
| 10. | Celebration of national days as per NSS list. |