



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 (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

| Regulation: R20 | | | I / IV - B.Tech. I - Semester | | | | | | |
|--|---|----------|-------------------------------|----|---|---|------------|------------|-------------|
| COMPUTER SCIENCE AND DESIGN | | | | | | | | | |
| SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2021-22 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 1110 | Biology for Engineers | 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 CD 1101 | Digital Logic Design | 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 HS 1102 | Communication Skills Lab | HS | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 CD 1102 | Free & Open Source Software (FOSS) Lab | 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,AIIML & CSG) | | | | | | | | |
| 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 <i>learning about the language</i> to <i>using the language</i> . 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 of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions. | | | | | | | | |
| Course Objectives: | | | | | | | | |
| 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 and responding 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 text and 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, essays and 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 <i>Infotech English</i> , 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. | | | | | | | | |

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

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| UNIT-IV (8 Hrs) | <p>Lesson: Liking a Tree, Unbowed: Wangari Maathai biography from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio), listening to audio-visual texts.</p> <p>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.</p> <p>Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.</p> <p>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.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words), antonyms and synonyms, word applications, cloze encounters, foreign phrases.</p> <p>Grammar: Quantifying expressions - adjectives and adverbs: comparing and contrasting, question Tags, direct and indirect speech, reporting for academic purposes.</p> |
| UNIT-V (8 Hrs) | <p>Lesson: Stay Hungry–Stay Foolish from <i>Infotech English</i>, Maruthi Publications.</p> <p>Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.</p> <p>Speaking: Formal oral presentations on topics from academic contexts– with/without the use of PPT slides. Functional English: Suggesting/Opinion giving.</p> <p>Reading: Reading for comprehension, RAP Strategy - intensive reading and extensive reading techniques.</p> <p>Reading for Writing: Report writing, writing academic proposals- writing research articles: format and style.</p> <p>Vocabulary: Technical vocabulary from across technical branches (20 words GRE Vocabulary (20 words, antonyms and synonyms, word applications, coherence, matching emotions.</p> <p>Grammar: Editing short texts — identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject-verb agreement, parallel structures, phrases and clauses).</p> |
| Text Books: | |
| 1 | <i>Infotech English</i> , Maruthi Publications. |
| 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. |

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| 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 |

| Subject Code | Category | L | T | P | C | I.M | E.M | Exam |
|--|--|---|---|---|---|-----|-----|--------|
| B20 BS 1101 | BS | 3 | - | - | 3 | 30 | 70 | 3 Hrs. |
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| MATHEMATICS-I | | | | | | | | |
| (LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS) | | | | | | | | |
| (Common to AIDS, CE, CSE, ECE, EEE, IT ,ME & CSG) | | | | | | | | |
| Pre-requisites: Calculus of functions of a single variable and Matrices. | | | | | | | | |
| Course Objectives: Students are expected to learn | | | | | | | | |
| 1. | Concepts of linear algebra and methods of solution of linear simultaneous algebraic equations. | | | | | | | |
| 2. | Eigenvalues, 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. | | | | | | | |
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| Course Outcomes: At the end of the course the student will be able to | | | | | | | | |
| SNO | 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. | Apply the 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 | | | | | | | | |
| 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. | | | | | | | |
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| 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. | | | | | | | |
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| UNIT-III (10Hrs) | 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) | | | | | | | |
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| 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) | <p>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.</p> |
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| Text Books: | |
| 1. | B.S.Grewal, Higher Engineering Mathematics, 43 rd 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, 10 th Edition, Wiley-India. |
| 3. | Michael Greenberg, Advanced Engineering Mathematics, 9 th 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. |
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| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|--|---|---|----|----|---|-----|-----|--------|
| B20BS1110 | BS | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |
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| BIOLOGY FOR ENGINEERS | | | | | | | | |
| (For CSBS) | | | | | | | | |
| Course Objectives: | | | | | | | | |
| 1. | To introduce the basics of Biology which includes cell - the unit of life, Different types of cells and classification of living organisms. | | | | | | | |
| 2. | To understand what biomolecules are present in a cell, their structure function and their role in a living organism. | | | | | | | |
| 3. | To understand the hereditary units, that is genes and genetic materials (DNA and RNA) present in living organisms and how they replicate and pass and preserve vital information in living organisms | | | | | | | |
| 4. | To differentiate and understand the various forms of life - Viruses, Bacteria and other higher order organisms. | | | | | | | |
| 5. | To encourage engineering students to think about solving biological problems with engineering tools | | | | | | | |
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| Course Outcomes: At the end of the course students will be able to | | | | | | | | |
| S. No | Out Comes | | | | | | | KL |
| 1. | Correlate biological observations that lead to major discoveries and importance | | | | | | | K1 |
| 2. | Understand various kingdoms of the living world based on cell types and body organizations. | | | | | | | K2 |
| 3. | Appreciate the essential materials of life i.e, biomolecules | | | | | | | K2 |
| 4. | Analyze the basic biological processes related to energy currency of life | | | | | | | K2 |
| 5. | Acquire knowledge about chromosomes and genetic material | | | | | | | K3 |
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| SYLLABUS | | | | | | | | |
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| UNIT-I (10Hrs) | Introduction Introduction to basic biology, Importance of biology - Microbes, Biotechnology, Healthcare, Food Security & Public Health Related Societal Issues, Biological observations lead to major discoveries, Human genetic diseases, Biological data. | | | | | | | |
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| UNIT-II (10Hrs) | Classification of Living World Hierarchy of classification, Types of cells-Prokaryotic and Eukaryotic, Body organization, six kingdom classification of living world, Microbes- virus, bacteria and protists. | | | | | | | |
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| UNIT-III (10Hrs) | Biomolecules Molecules of life, Monomeric units and polymeric structures, Carbohydrates, Lipids, Proteins, Nucleic acids- DNA and RNA. Enzymes-classification and mechanism of enzyme action. | | | | | | | |
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| UNIT-IV (10Hrs) | Metabolism Laws of thermodynamics, thermodynamics applied to biological systems, ATP as an energy currency, Energy harvesting pathways- Photosynthesis, cellular respiration and fermentation. |
| UNIT-V (10Hrs) | Genetics Chromosomes- Genes/Alleles, Cell cycle and cell division, DNA as a genetic material, Gene functioning mechanism (DNA to Protein), Genotype to phenotype, Mutations-genetic errors. |
| Text Books: | |
| 1. | Biology for Engineers: As per Latest AICTE Curriculum; Wiley Editorial, 2018. |
| 2. | T Johnson, Biology for Engineers, CRC press, 2011Molecular Biology and Biotechnology 2nded. J.M. Walker and E.B. Gingold. Panima Publications. PP 434. |
| Reference Books / Resources: | |
| 1. | Introduction to Bioinformatics by Teresa K. Attwood, David Parry-Smith; Pearson Education, 1999. |
| 2. | ThyagaRajan.S., Selvamurugan. N., Rajesh.M.P., Nazeer.R.A., Richard W. Thilagaraj, Barathi.S., and Jaganthan.M.K., “Biology for Engineers”, Tata McGraw-Hill, New Delhi, 2012. |
| 3. | http://www.dnaftb.org/ |
| 4. | https://www.biologyonline.com/tutorials |

| 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, AIML & CSG)

Course Objectives:

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. |
| 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 |

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| | Function, Array of Pointers, Programming Application. Processor Commands: Processor Commands. |
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| 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 | |
|---|--|---|----|----|---|-----|-----|--------|----|
| B20CD1101 | ES | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. | |
| | | | | | | | | | |
| DIGITAL LOGIC DESIGN | | | | | | | | | |
| (For CSG) | | | | | | | | | |
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| Course Objectives: | | | | | | | | | |
| 1. | To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, theory of Boolean algebra and map method for minimization of switching functions. | | | | | | | | |
| 2. | To introduce the basic tools for design of combinational and sequential digital logic. | | | | | | | | |
| 3. | To learn simple digital circuits in preparation for computer engineering. | | | | | | | | |
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| Course Outcomes:At the end of the course the students will be able to | | | | | | | | | |
| S.No | Outcome | | | | | | | | KL |
| 1. | Demonstrate different number systems, binary addition and subtraction, 2’s complement representation and operations with this representation. | | | | | | | | K2 |
| 2. | Understand the different switching algebra theorems and apply them for logic functions. | | | | | | | | K3 |
| 3. | Define the Karnaugh map for a few variables and make use for an algorithmic reduction of logic functions. | | | | | | | | K3 |
| 4. | Understand various logic gates starting from simple ordinary gates to complex programmable logic devices &arrays and design different combinational logic circuits. | | | | | | | | K3 |
| 5. | Design various sequential circuits starting from flip-flop to registers and counters. | | | | | | | | K3 |
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| SYLLABUS | | | | | | | | | |
| UNIT-I (10 Hrs) | Digital Systems and Binary Numbers Digital Systems, Binary Numbers, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Arithmetic addition and subtraction, 4-bit codes: BCD, EXCESS 3, alphanumeric codes, 9’s complement, 2421, etc. | | | | | | | | |
| | | | | | | | | | |
| UNIT-II (10 Hrs) | Concept of Boolean algebra Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms. Gate level Minimization Map Method, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don’t – Care Conditions, NAND and NOR Implementation, Exclusive-OR Function. | | | | | | | | |
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| UNIT-III (10 Hrs) | Combinational Logic Introduction, Analysis Procedure, Binary Adder–Subtractor, Binary Multiplier, Decoders, Encoders, Multiplexers, Demultiplexers, Priority Encoder, Code Converters, Magnitude Comparator, HDL Models of Combinational Circuits. Realization of Switching Functions Using PROM, PAL and PLA. | | | | | | | | |
| | | | | | | | | | |
| UNIT-IV (10 Hrs) | Synchronous Sequential Logic Introduction to Sequential Circuits, Storage Elements: 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 | | | | | | | | |

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| UNIT-V (10 Hrs) | Registers and Counters Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counter, Johnson Counter. |
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| Text Books: | |
| 1. | Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA. |
| 2. | Fundamentals of Logic Design, 5/e, Roth, Cengage. |
| | |
| Reference Books: | |
| 1. | Digital Logic and Computer Design, Morris Mano, Pearson India |
| 2. | Digital Logic Design, Brain Holds worth, Cline woods, O'Relly |
| 3. | Modern Digital Electronics, R.P Jain, Mc Graw Hill, 4th edition |
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| 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, AIML & CSG) | | | | | | | | | |
| 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: 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. | | | | | | | | |
| 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 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: 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. $1 + 1/2 + 1/3 + 1/4 + 1/5 \dots 1/n$ 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. | | | | | | | | |

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|-------------------------|---|
| | 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, allocate memory 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 programs 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. |
| 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 |

| Code | Category | L | T | P | C | I.M | E.M | Exam | |
|--|---|----|----|---|-----|-----|-----|--------|----|
| B20 HS 1102 | HS | -- | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. | |
| COMMUNICATION SKILLS LAB | | | | | | | | | |
| (Common to AIDS ,CE,CSE,ECE,EEE,IT,ME & CSG) | | | | | | | | | |
| Course Objectives: | | | | | | | | | |
| 1. | To expose to a variety of self-instructional, learner-friendly modes of language learning. | | | | | | | | |
| 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: | | | | | | | | | |
| 1. | Apply their linguistic competence in all LSRW skills to professional and personal settings. | | | | | | | | KL |
| 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 |
| LIST OF EXPERIMENTS | | | | | | | | | |
| 1 | A list of communicative expressions (Requests, Permissions, Asking/ giving directions, Thanking and Responding to Thanks, Clarifying, Inviting, Congratulating, Advising, Agreeing and disagreeing etc.,) Common Errors | | | | | | | | |
| 2 | Pronunciation Letters and Sounds The Sounds of English Stress and Intonation Phonetic Transcription | | | | | | | | |
| 3 | Group Discussions | | | | | | | | |
| 4 | Presentation Skills | | | | | | | | |
| 5 | Interview Skills : Resume/ Curriculum Vitae Covering Letter FAQ's : Telephonic Interviews/ Etiquette 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 CIEFL. | | | | | | | | |
| 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. Bala Subramanian, Mac Millan Publications | | | | | | | | |
| 6. | Technical Communication- Meenakshi Raman, Sangeeta Sharma, OUP. | | | | | | | | |
| 7. | Technical Communication- Gajendra Singh Chauhan, SmitaKashiramka, cengage Publications | | | | | | | | |

| Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|----|---|-----|-----|-----|--------|
| B20 CD 1102 | ES | - | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. |
| FREE & OPEN SOURCE SOFTWARE (FOSS) LAB | | | | | | | | |
| (For CSG) | | | | | | | | |
| Course Objectives: Skills and knowledge provided by this subject are the following: | | | | | | | | |
| 1. | PC Hardware: Identification of basic peripherals, Assembling a PC, Installation of system software like Operating System, device drivers, etc. Troubleshooting of PC Hardware and Software issues | | | | | | | |
| 2. | Open Source Software Usage: Well versed with usage of Linux and installation of associated software packages, Linux Administration, and Networking | | | | | | | |
| 3. | Productivity Tools: Understanding and practical approach of professional word documents, excel spreadsheets, powerpoint presentations and personal web sites using the open source office suite - LibreOffice. | | | | | | | |
| Course Outcomes | | | | | | | | |
| SNO | Students will be able to | | | | | | | KL |
| 1. | Identify, assemble and update the components of a computer | | | | | | | K3 |
| 2. | Install and use open source software and computer applications, services and systems in Linux Platform. | | | | | | | K3 |
| 3. | Make use of tools for develop new designs and documents | | | | | | | K3 |
| 4. | Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets | | | | | | | K3 |
| SYLLABUS | | | | | | | | |
| Note: Faculty to consolidate the workshop manuals using the textbook and references | | | | | | | | |
| List of Exercises: | | | | | | | | |
| 1 | Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Identify the Hardware components of computers. Assembling and Disassembling | | | | | | | |
| 2 | Installation of GNU/Linux Operating System, Disk Partitioning, Swap Space | | | | | | | |
| 3 | Getting acquainted with the GUI of GNU/Linux Operating System and configuring the settings, setting up Desktop Environment, Browsers. Introduction to Kernel, Command Line In Linux, Bash File Operations, Documentation | | | | | | | |
| 4 | Linux System Administration-Permissions, Users, Search, Pattern Search, Disk Management. | | | | | | | |
| 5 | Shell scripting – Basic Scripting, Creating You Own Command, Automating And Scheduling Jobs Using Crontab. | | | | | | | |
| 6 | Package management –Package Installation, Repositories, Sources List, Apt, Snap Installing A Deb File , Building From Sources | | | | | | | |
| 7 | Networking – Setting Up Network, Static/DHCP, Managing Network Using Command Line And GUI, remote connection using ssh, scp and rsync | | | | | | | |
| 8 | Introduction to Various Text Editors - vim, nano gedit, atom etc. | | | | | | | |
| 9 | Troubleshooting the hardware, software and other issues in gnu/ linux, grub etc | | | | | | | |
| 10 | Introduction to Libre Office Writer, Page And Paragraph Formatting Fonts, Exporting | | | | | | | |

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|-------------------------------------|---|
| | Header And Footer, Tables Bullets, Spacing Etc. |
| 11 | Managing Spreadsheet Using Libre Office Calc – Auto Fill, Table Formulas, Conditional Formatting, Lookup, Etc |
| 12 | Creating a document using Latex. |
| 13 | Vector Graphic Design Using Inkscape |
| Text Books/ Reference Books: | |
| 1. | Computer Fundamentals, Anita Goel, Pearson India Education, 2017 |
| 2. | Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N. B. Venkateswarlu, S. Chand Publishers |
| 3. | LaTeX Companion – Leslie Lamport, PHI/Pearson |
| 4. | https://inkscape.org/learn/tutorials/ |
| 5. | https://www.libreofficehelp.com/ |

| Regulation: R20 | | | I / IV - B.Tech. II - Semester | | | | | | |
|--|------------------------------------|----------|--------------------------------|----|---|----|------------|------------|-------------|
| COMPUTER SCIENCE AND DESIGN | | | | | | | | | |
| SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2021-22 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 CD 1201 | Python Programming | ES | 3 | 2 | 0 | 0 | 30 | 70 | 100 |
| | | | | 0 | 0 | 2 | 15 | 35 | 50 |
| B20 ME 1205 | Design Drawing & Visualization | ES | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| B20 CS 1203 | Data Structures | ES | 3 | 3 | 0 | 0 | 30 | 70 | 100 |
| B20 CD 1203 | Design Thinking and Innovation lab | ES | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 BS 1207 | Applied Physics Lab | BS | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 CS 1206 | Data Structures Lab | ES | 1.5 | 0 | 0 | 3 | 15 | 35 | 50 |
| B20 MC 1202 | Professional Ethics & Human values | MC | 0 | 2 | 0 | 0 | -- | -- | -- |
| B20 MC 1203 | National Service Scheme (NSS) | MC | 0 | 0 | 0 | 2 | -- | -- | -- |
| TOTAL | | | 19.5 | 14 | 0 | 17 | 210 | 490 | 700 |

Note: *- Integrated course and its evaluation guide lines are mentioned in the Syllabus

| Subject Code | Category | L | T | P | C | I.M | E.M | Exam |
|--|---|---|----|----|---|-----|-----|--------|
| B20 BS 1201 | BS | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |
| | | | | | | | | |
| MATHEMATICS – II | | | | | | | | |
| (FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS) | | | | | | | | |
| (Common to AIDS, CE, CSE, ECE, EEE, IT ,ME&CSG) | | | | | | | | |
| Prerequisites: Calculus of functions of a single variable and Geometry | | | | | | | | |
| Course Objectives: Students 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 | Determine Fourier series and half range series of functions | | | | | | | K3 |
| 2 | Determine Fourier transforms 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 Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Change of interval. Even and odd functions, Half-range sine and cosine series. | | | | | | |
| UNIT-II (12 Hrs) | | 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. | | | | | | |

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| UNIT-III (10 Hrs) | 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 (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, 43 rd 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, 10 th Edition, Wiley-India. |
| 4 | David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3 rd Edition, Universities Press. |
| 5 | Srimanta Pal, Subodh C.Bhunia, engineering Mathematics, Oxford University Press. |
| 6 | Dass H.K., Rajnish Verma. Er., Higher engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi. |
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| Subject Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|--|---|----|----|---|-----|-----|--------|
| B20 BS 1202 | BS | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |
| APPLIED PHYSICS | | | | | | | | |
| (Common to CSE,ECE,IT&CSG) | | | | | | | | |
| 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 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, Fraunhofer diffraction at a single slit, Diffraction grating, grating spectrum. Missing order, Resolving power, Rayleigh’s Criterion, Resolving power of Grating | | | | | | | |
| UNIT-II (10 Hrs) | 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, Clausius 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 (Dia , Para, Ferro, Antiferro and ferri), Hysteresis – Weiss Domain theory – Ferrites, soft and hard magnetic materials, Magnetic device applications. | | | | | | | |

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| UNIT-III (10 Hrs) | <p>LASERS AND FIBER OPTICS</p> <p>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.</p> <p>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.</p> |
| UNIT-IV (9 Hrs) | <p>SEMICONDUCTORS</p> <p>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.</p> |
| UNIT-V (9 Hrs) | <p>ULTRASONICS AND NANOMATERIALS</p> <p>Ultrasonics: Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, detection of ultrasonics, acoustic grating - determination of wavelength and velocity of ultrasonics, applications of ultrasonics.</p> <p>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.</p> |
| 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/ |

| Subject Code | Category | L | T | P | C | I.M | E.M | Exam |
|---|---|---|---|---|---|------------|------------|----------------|
| B20 CD 1201 | ES | 2 | 0 | 2 | 3 | Theory: 30 | Theory: 70 | Theory: 3 Hrs. |
| | | | | | | Lab:15 | Lab:35 | Lab: 3 Hrs. |
| | | | | | | | | |
| PYTHON PROGRAMMING | | | | | | | | |
| (For CSG) | | | | | | | | |
| | | | | | | | | |
| Course Objectives: The Objectives of Python Programming are | | | | | | | | |
| 1. | To learn about Python programming language syntax, semantics, and the runtime environment | | | | | | | |
| 2. | To be familiarized with universal computer programming concepts like data types, containers | | | | | | | |
| 3. | To be familiarized with general computer programming concepts like conditional execution, loops & functions | | | | | | | |
| 4. | To be familiarized with general coding techniques and object-oriented programming | | | | | | | |
| 5. | To be familiarized with Exceptions and GUI applications. | | | | | | | |
| | | | | | | | | |
| Course Outcomes: | | | | | | | | |
| Sno | Out Come | | | | | | | KL |
| 1. | Develop essential programming skills in computer programming concepts like data types , containers | | | | | | | K2 |
| 2. | Apply the basics of programming, conditional execution, loops in the Python language | | | | | | | K2 |
| 3. | Apply Lists , Dictionaries and modular programming techniques to solve problems | | | | | | | K2 |
| 4. | Employ files to write python programs | | | | | | | K2 |
| 5. | Use Exceptions and GUI to write python programs. | | | | | | | K2 |
| | | | | | | | | |
| SYLLABUS | | | | | | | | |
| UNIT-I (10Hrs) | Introduction: Introduction to Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, Operators. Type conversions, Expressions, More about Data Output. Data Types, and Expression: Strings Assignment, and Comment, Numeric Data Types and Character Sets, Using functions and Modules. Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. | | | | | | | |
| UNIT-II (10Hrs) | Control Statement: Define iteration for Loop Formatting Text for output, Repetition Structures: Introduction to Loops, while loop, for loop, Conditional Iteration , Calculating a Running Total, Input Validation, Nested Loops. Strings: Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods. | | | | | | | |
| UNIT-III (10Hrs) | List and Dictionaries: Lists, Defining Simple Functions, Dictionaries Design with Function: Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System, Managing a Program’s Namespace, Higher Order Function. | | | | | | | |

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| UNIT-IV (10Hrs) | Modules: Modules, Standard Modules, Packages. File Operations: Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, Programming using file operations |
| UNIT-V (10Hrs) | Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions. Graphical User Interfaces: The Behaviour of Terminal Based Programs and GUI -Based, Programs, Coding Simple GUI-Based Programs, Other Useful GUI Resources. |
| SYLLABUS (Laboratory) | |
| 1 | Write a program that asks the user for a weight in kilograms and converts it to pounds. There are 2.2 pounds in a kilogram. |
| 2 | Write a program that asks the user to enter three numbers (use three separate input statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average. |
| 3 | Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89 |
| 4 | Write a program that asks the user for their name and how many times to print it. The program should print out the user's name the specified number of times. |
| 5 | Use a forloop to print a triangle like the one below. Allow the user to specify how high the triangle should be. * ** *** **** |
| 6 | Write a program that asks the user to enter two strings of the same length. The program should then check to see if the strings are of the same length. If they are not, the program should print an appropriate message and exit. If they are of the same length, the program should alternate the characters of the two strings. For example, if the user enters abcdeandABCDE the program should print out AaBbCcDdEe. |
| 7 | Write a program that generates a list of 20 random numbers between 1 and 100. (a) Print the list. (b) Print the average of the elements in the list. (c) Print the largest and smallest values in the list. (d) Print the second largest and second smallest entries in the list Print how many even numbers are in the list. |
| 8 | Write a Python class to reverse a string word by word. |
| 9 | Write a program that reads a list of temperatures from a file called temps.txt, converts those temperatures to Fahrenheit, and writes the results to a file called ftemps.txt. |
| 10 | Write a program that opens a file dialog that allows you to select a text file. The program then displays the contents of the file in a textbox. |
| 11 | Write a program to demonstrate Try/except/else. Write a program to demonstrate try/finally and with/as. |
| 12 | Write a program that asks the user for a weight in kilograms and converts it to pounds. There are 2.2 pounds in a kilogram. |

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| 13 | Write a program that asks the user to enter three numbers (use three separate input statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average. |
| 14 | Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89 |
| Text Books: | |
| 1. | Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage. |
| 2. | Python Programming: A Modern Approach, VamsiKurama, Pearson. |
| Reference Books: | |
| 1. | Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press. |
| 2. | Introduction to Programming Using Python, Y. Daniel Liang, Pearson. |
| 3. | e-R esources: https://www.tutorialspoint.com/python3/python_tutorial.pdf |

Evaluation guidelines for the integrated course:

The Student has to pass both theory and lab examinations separately in order to complete the Integrated Course. If the Student fails in either theory or lab, he/she has to reappear for both theory and lab in supplementary examinations. Student will be declared as pass only when he/she completes both theory and lab at the same time.

| Code | Category | L | T | P | C | I.M | E.M | Exam |
|----------------------------------|---|---|----|---|---|-----|-----|-----------------|
| B20ME1205 | ES | 1 | -- | 4 | 3 | 30 | 70 | 3 Hrs. |
| DESIGN DRAWING AND VISUALIZATION | | | | | | | | |
| (For CSG) | | | | | | | | |
| 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 | | | | | | | | |
| S.No | Outcome | | | | | | | Knowledge Level |
| 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 and Solids | | | | | | | K3 |
| 4. | Apply principles of isometric projections to draw the pictorial view of solids. | | | | | | | K3 |
| 5. | Apply the principles of perspective projections to draw the projections of points, lines, planes and solids. | | | | | | | K3 |
| SYLLABUS | | | | | | | | |
| UNIT-I (8Hrs) | Introduction to Design Drawing: Geometrical Constructions, Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles. Engineering Curves: Parabola, Ellipse and Hyperbola by using general method only, cycloids, involutes, tangents & normals for the curves. | | | | | | | |
| UNIT-II (10 Hrs) | Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and perpendicular to other plane, line parallel to one plane and inclined to other plane. Projections of straight lines inclined to both the planes, determination of true lengths and angle of inclination. | | | | | | | |
| UNIT-III (12 Hrs) | 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. Projections of Solids: – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the reference planes. | | | | | | | |
| UNIT-IV (12 Hrs) | Isometric Projections: Introduction to Isometric projection and Isometric projection of simple Right and Regular Solids – Prism, Cylinder, Pyramid and Cone. Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views. | | | | | | | |
| UNIT-V (10 Hrs) | Perspective Projections: Introduction to perspective projection and Perspective projections of points, lines, planes and solids (using visual ray method), Perspective projection of solids using vanishing point method. | | | | | | | |

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| | Visualization using AutoCAD: Computer Aided Drafting, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD (Only for Demonstration Purpose) |
| | |
| Text Books: | |
| 1. | Engineering Drawing by N.D. Bhatt, Chariot Publications, 2011. |
| 2. | Engineering Drawing by Agarwal&Agarwal, 2nd ed, Tata McGraw Hill Publishers, 2013. |
| 3. | Erik Olofsson, KlaraSjolen, Design Sketching, 3rd ed, KEEOS Design Books, 2007. |
| 4. | K .Morling, Geometric and Engineering Drawing, Third Edition, Graduate of the Institution of Mechanical Engineers, SI Units, Elsevier, 2010 |
| | |
| Reference Books: | |
| 1. | Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers, 3rd ed, 2011. |
| 2. | Engineering Graphics for Degree by K.C. John, PHIPublishers, 2009. |
| 3. | Engineering Graphics by PI Varghese, McGrawHill Publishers, 2013. |
| 4. | Engineering Drawing + AutoCad K Venugopal, V. Prabhu Raja, New Age, 2010. |
| 5. | KoosEissen, RoselienSteur, Sketching: The Basics, BIS Publishers, 2011. |
| | |

| Course Code | Category | L | T | P | C | I.M | E.M | Exam |
|-----------------------|---|---|----|----|---|-----|-----|--------|
| B20CS1203 | ES | 3 | -- | -- | 3 | 30 | 70 | 3 Hrs. |
| | | | | | | | | |
| DATA STRUCTURES | | | | | | | | |
| (Common to CSE & CSG) | | | | | | | | |
| Course Objectives: | | | | | | | | |
| 1. | Be familiar with basic techniques of algorithm analysis | | | | | | | |
| 2. | Master the implementation of data structures like stacks, queues, linked lists, binary trees, graphs. | | | | | | | |
| 3. | Be familiar with basic techniques for algorithm development like recursion. | | | | | | | |
| 4. | Be familiar with several sub-quadratic sorting algorithms including quick sort, merge sort and heap sort | | | | | | | |
| 5. | Master analyzing problems and writing program solutions to problems using the above techniques. | | | | | | | |
| | | | | | | | | |
| Course Outcomes: | | | | | | | | |
| S.No | Outcome | | | | | | | KL |
| 1. | Demonstrate the concept of recursion, the way arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory. | | | | | | | K3 |
| 2. | Implement stacks, linked lists, queues and trees and apply them to solve different Computer Science problems and Engineering problems. | | | | | | | K3 |
| 3. | Compare alternative implementations of data structures with respect to performance. | | | | | | | K4 |
| 4. | Apply the principal algorithms for sorting and searching to the given data and analyze the computational efficiency. | | | | | | | K3 |
| 5. | Make use of Graphs to solve real life applications. | | | | | | | K3 |
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| SYLLABUS | | | | | | | | |
| | | | | | | | | |
| UNIT-I (10 Hrs) | Basic Concepts: Arrays, Structures: System Life Cycle, Algorithm Specification, Data Abstraction, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notation, Comparing Time Complexities. Array as an Abstract Data Type, Polynomial Abstract Data Type, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures Simple Searching and Sorting Techniques: Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Shell Sort, Introduction to Merge Sort, Introduction to Recursion: Towers of Hanoi, Quick Sort, Merge Sort, Complexity Analysis of Basic Sorting and Searching techniques | | | | | | | |
| | | | | | | | | |
| UNIT-II (10 Hrs) | Stacks, Queues Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Circular Queues using arrays. Pointers, Dynamically Allocated Storage using pointers, Dynamically Linked Stacks and Queues | | | | | | | |
| | | | | | | | | |
| UNIT-III (10 Hrs) | Linked Lists: Singly Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list, Radix Sort. Circular Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from Circular Linked Lists. | | | | | | | |

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| | Doubly Linked Lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from Doubly Linked Lists. Polynomials: Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials. |
| UNIT-IV (10 Hrs) | Trees: Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree. |
| UNIT-V (10 Hrs) | Graphs: Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim's and Kruskal's Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination - Dijkstra's Algorithm |
| Text Books: | |
| 1. | Fundamentals of Data Structures in C, 2nd edition, Horowitz, Sahni and Anderson-Freed, Universities Press, 2008. |
| Reference Books: | |
| 1. | Data Structures using C by Aaron M. Tenenbaum, Y. Langsam and M.J. Augenstein, Pearson Education, 2009. |
| 2. | Data Structures with C by Seymour Lipschutz, Schaum Outline series, 2010. |
| 3. | Data Structures using C by R. KrishnaMoorthy G. Indirani Kumaravel, TMH, New Delhi, 2008. |
| e-Resources | |
| 1. | https://nptel.ac.in/courses/106/102/106102064/ |
| 2. | https://www.tutorialspoint.com/data_structures_algorithms/index.htm |
| 3. | https://www.geeksforgeeks.org/data-structures/ |

| Code | Category | L | T | P | C | I.M | E.M | Exam |
|--|---|----|----|---|-----|-----|-----|--------|
| B20 CD 1202 | ES | -- | -- | 3 | 1.5 | 15 | 35 | 3 Hrs. |
| DESIGN THINKING AND INNOVATION LAB | | | | | | | | |
| (For CSG) | | | | | | | | |
| Course Objectives: | | | | | | | | |
| 1 | To experiment and experience the design thinking process and implement it to solve real world problems. | | | | | | | |
| 2 | Learn how to ideate, prototype and Iterate solutions. | | | | | | | |
| 3 | Learn how to design successful products or enterprises | | | | | | | |
| Course Outcomes: At the end of the course students will be able to | | | | | | | | |
| S.No | Out Come | | | | | | | KL |
| 1. | Design a solution to a real world problem | | | | | | | K4 |
| 2. | Apply design thinking approach for product innovation | | | | | | | K3 |
| 3. | Design and create a business model for an idea | | | | | | | K5 |
| LIST OF EXPERIMENTS | | | | | | | | |
| 1 | Introduction to Design Thinking - Case Study | | | | | | | |
| 2 | Mini Project Selection - Business / Innovative Idea - Form Teams | | | | | | | |
| 3 | Empathize - Observe, Engage and Immerse - Brainstorming and Mindmapping | | | | | | | |
| 4 | Empathize - User Centric Approach. Create an Empathy Map | | | | | | | |
| 5 | Define - Define the problem statement | | | | | | | |
| 6 | Define - Storytelling - Plan and Conduct Research | | | | | | | |
| 7 | Ideate - Find Key Opportunities, Generate Ideas, Brainstorm and Iterate Ideation | | | | | | | |
| 8 | Ideate - Storyboarding & Feedback to select the Best Idea | | | | | | | |
| 9 | Prototype - Draft a solution prototype and design a prototype model | | | | | | | |
| 10 | Prototype - Create the prototype and refine it | | | | | | | |
| 11 | Test - Test the prototype built, assumptions, test conditions | | | | | | | |
| 12 | Design Pitch - Present the idea, collect feedback | | | | | | | |
| 13 | Business Models - Create a Lean Model Canvas for the business idea | | | | | | | |
| 14 | Final Presentation & Project Report Submission | | | | | | | |
| Reference Books: | | | | | | | | |
| 1. | Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School -IdrisMootee. | | | | | | | |
| 2. | https://static1.squarespace.com/static/5a5473c6692ebdda684e573/t/5e505192256c3b0e6af1afbf/1582322071165/Bright+Spark+Design+Thinking+Full+Worksheet.pdf | | | | | | | |
| 3. | Zero to One: Note on Start-Ups, or How to Build the Future | | | | | | | |
| 4. | The Lean Startup: How Constant Innovation Creates Radically Successful Businesses | | | | | | | |

| 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 & CSG) | | | | | | | | |
| 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 (μ_o and μ_e) 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 |
|-----------------------|---|---|---|---|-----|-----|-----|--------|
| B20CS1206 | ES | 0 | 0 | 3 | 1.5 | 15 | 35 | 3 Hrs. |
| | | | | | | | | |
| DATA STRUCTURES LAB | | | | | | | | |
| (Common to CSE & CSG) | | | | | | | | |
| Course Objectives: | | | | | | | | |
| 1. | To implement stacks and queues using arrays and linked lists. | | | | | | | |
| 2. | To develop programs for searching and sorting algorithms. | | | | | | | |
| 3. | To write programs using concepts of various trees. | | | | | | | |
| 4. | To implement programs using graphs. | | | | | | | |
| | | | | | | | | |
| Course Outcomes: | | | | | | | | |
| 1. | Student will be able to write programs to implement stacks and queues. | | | | | | | K3 |
| 2. | Ability to implement various searching and sorting techniques. | | | | | | | K4 |
| 3. | Ability to implement programs using trees and graphs. | | | | | | | K4 |
| | | | | | | | | |
| LIST OF PROGRAMS | | | | | | | | |
| | | | | | | | | |
| 1 | Write a program for sorting a list using Bubble sort and then apply binary search. | | | | | | | |
| 2 | Write a program to implement the operations on stacks. | | | | | | | |
| 3 | Write a program to implement the operations on circular queues. | | | | | | | |
| 4 | Write a program for evaluating a given postfix expression using stack. | | | | | | | |
| 5 | Write a program for converting a given infix expression to postfix form using stack. | | | | | | | |
| 6 | Write a program for implement the following using recursion i) Towers of Hanoi ii) GCD of two numbers iii) Maximum element in an array | | | | | | | |
| 7. | Write a program to implement insert, delete, traverse, search operations on singly linked lists | | | | | | | |
| 8. | Write a program to implement insert, delete, traverse, search operations on circular linked lists | | | | | | | |
| 9. | Write a program to implement insert, delete, traverse, search operations on doubly linked lists | | | | | | | |
| 10 | Write a program for the representation of polynomials using linked list and for the addition of two such polynomials. | | | | | | | |
| 11 | Write a program for quick sort . | | | | | | | |
| 12 | Write a program for Merge sort. | | | | | | | |
| 13 | Write a program for Heap sort . | | | | | | | |
| 14 | Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion. | | | | | | | |
| 15 | Write a program for finding the transitive closure of a digraph. | | | | | | | |
| 16 | Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm. | | | | | | | |
| 17 | a)Write a program for finding the Depth First Search of a graph. b)Write a program for finding the Breadth First Search of a graph | | | | | | | |
| 18 | Write a program to implement Prims Algorithm. | | | | | | | |
| | | | | | | | | |
| Reference Books: | | | | | | | | |
| 1. | Fundamentals of Data Structures in C, 2nd edition, Horowitz, Sahani and Anderson-Freed, | | | | | | | |

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|--------------------|---|
| | Universities Press, 2008. |
| | |
| e-Resources | |
| 1 | https://nptel.ac.in/courses/106/102/106102064/ |
| 2 | https://www.tutorialspoint.com/data_structures_algorithms/index.htm |
| 3 | https://www.geeksforgeeks.org/data-structures/ |
| | |

| 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, AIML & CSG) | | | | | | | | |
| 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 Character Spirituality. | | | | | | | |
| | | | | | | | | |
| UNIT-II (10 Hrs) | 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 Uses of Ethical theories Valuing time Cooperation Commitment. | | | | | | | |
| | | | | | | | | |
| UNIT-III (8 Hrs) | Engineering as Social Experimentation: Engineering As Social-Experimentation- Framing the problem- Determiningthefacts codesofEthics- Clarifying Concepts- 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 | | | | | | | |

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| | 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. | | | | | | | |