SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, Tirupati

Department of Computer Science and Systems Engineering

Courses having focus on

Employability/ Entrepreneurship/ skill Development

Program: B. Tech.- Computer Science and Business Systems

Regulations: SVEC-20

The Courses (with course outcomes) under SVEC-19 Regulations which focus on **employability/ entrepreneurship/ skill development** are highlighted with the following colours.

Skill

Employability

Entrepreneurship

I B. Tech. - I Semester
(20BT1BS01) DIFFERENTIAL EQUATIONS AND MULTIVARIABLE CALCULUS
(Common to CE, ME, EEE, ECE, EIE, CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	-	-	3

PRE REQUISITE: -

COURSE DESCRIPTION: Ordinary Differential Equations; Partial Differential Equations; Multivariable Calculus (Differentiation); Multivariable Calculus (Integration); Multivariable Calculus (Vector Calculus).

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Formulate and solve differential equations by applying knowledge of calculus for Engineering problems.

CO2. Demonstrate knowledge in multivariable calculus for evaluating multiple integrals through techniques of integration.

CO3. Identify scalar and vector valued functions and evaluate vector integrals through knowledge of vector integral theorems and techniques.

DETAILED SYLLABUS:

UNIT-I: ORDINARY DIFFERENTIAL EQUATIONS   (9 Periods)

Ordinary Differential Equation: Order and Degree of Differential Equation; Second and higher order linear differential equations with constant coefficients: Non-Homogeneous equations with R.H.S terms of the type e^{ax}, $\sin ax$, $\cos ax$, polynomials in x, $e^{ax}V(x)$ and $xV(x)$; method of variation of parameters; Equations reducible to linear differential equations with constant coefficients: Cauchy's homogeneous and Legendre's linear equations; Applications to L-C-R Circuit problems.

UNIT-II: PARTIAL DIFFERENTIAL EQUATIONS   (9 Periods)

Formation of PDE, solutions of first order linear PDEs, Solution to homogenous and non-homogenous linear partial differential equations of second and higher order by complimentary function and particular integral method, method of Separation of variables in Cartesian coordinates.

UNIT-III: MULTIVARIABLE CALCULUS (DIFFERENTIATION)   (9 Periods)

Partial derivatives, Chain rule, Total derivative, Jacobian, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT-IV: MULTIVARIABLE CALCULUS (INTEGRATION)   (9 Periods)

Evaluation of Double integrals (Cartesian and polar coordinates), Change of order of integration (Cartesian form only); Evaluation of Triple integrals; Change of variables: double integration from Cartesian to polar coordinates, Triple integration from Cartesian to spherical polar coordinates; Areas enclosed by plane curves.

UNIT-V: MULTIVARIABLE CALCULUS (VECTOR CALCULUS)   (9 Periods)

Vector Differentiation: Scalar and Vector fields: Gradient of a scalar field, directional derivative, divergence of a vector field, solenoidal vector, curl of a vector field, irrotational vector, Laplacian operator. **Vector Integration:** Line integral - circulation-work done, Surface integral and Volume integral; Vector integral theorems: Theorems of Green, Gauss and Stokes (without proofs)-Problems related to theorems.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M. V. S. S. N. Prasad, *Engineering Mathematics, vol-1*, S. Chand and Company, 13th edition, 2014.
2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 44th edition, 2017.

REFERENCE BOOKS:

1. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Jones and Bartlett, 6th edition, 2011.
2. R. K. Jain and S. R. K. Iyengar, *Advanced Engineering Mathematics*, Alpha Science International Ltd., 6th edition, 2017.
3. Erwin kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th edition, 2006.

I B. Tech. - I Semester
(20BT1HS01) COMMUNICATIVE ENGLISH
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Introduction to Communication; Active Listening; Effective Speaking; Reading and Technical Writing.

COURSE OUTCOMES: After successful completion of this course, students will be able to:

CO1: Demonstrate knowledge of English language, examining and applying the aspects of Process of communication, Paralinguistic features, Skimming, Scanning, and Elements of style in writing.

CO2: Analyze the modes and techniques of listening, speaking, reading, writing and apply them appropriately to communicate effectively with the engineering community and society.

CO3: Apply reading and writing techniques in preparing documents by examining SQ3R Technique, Writer's Block, and Précis Writing.

CO4: Communicate effectively in Conferences, Symposia, Seminars and in formal and real time situations by applying appropriate speaking techniques learnt by examining different communication styles used in similar contexts.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO COMMUNICATION (9 Periods)

Introduction – Language as a Tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Modes of Communication – Barriers to Communication (classification)

UNIT- II: ACTIVE LISTENING (9 Periods)

Introduction – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening for General Content and Specific Information

UNIT – III: EFFECTIVE SPEAKING (9 Periods)

Introduction – Achieving Confidence, Clarity and Fluency – Paralinguistic Features – Barriers to Speaking – Types of Speaking – Conferences; significance, planning and preparation and procedure – Symposia and Seminars - Persuasive Speaking

UNIT – IV: READING (9 Periods)

Introduction – Reading and Interpretation – Intensive and Extensive Reading – Critical Reading – Techniques for Good Comprehension – SQ3R Reading Technique – Study Skills

UNIT –V: TECHNICAL WRITING (9 Periods)

Introduction – Language – Elements of Style – Techniques for Good Technical Writing – Paragraphs Construction – Essays: types, Steps to Essay Writing and Checklist – Précis Writing

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.
2. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt. Ltd., New Delhi, 2018.

REFERENCE BOOKS:

1. Sanjay Kumar & Pushp Lata, *Communication Skills*, Oxford University Press, New Delhi, 2013.
2**.** Rajendra Pal and J. S. Korlahalli, *Essentials of Business Communication*, Sultan Chand and Son, New Delhi, 2010.

ADDITIONAL LEARNING RESOURCES
1. https://www.skillsyouneed.com/ips/active-listening.html: A useful summary of what active listening skills are.
2. https://en.wikipedia.org/wiki/Active_listening: Wikipedia entry about active listening.
3. https://www.forbes.com/sites/womensmedia/2012/11/09/10-steps-to-effective-listening/#4b27a2503891: Ten steps to Active Listening (by Forbes magazine).
4. https://goo.gl/t1Uqrt: 20 tips for organizing a conference.
5. https://goo.gl/kPMr9u: 10 important issues for speakers at a conference.
6. https://goo/gl/C5bDvv: Wikihow guide to organizing a conference.

(20BT11201) PROGRAMMING FOR PROBLEM SOLVING
(Common to CSE, CSSE, IT, CSE (AI), CSE (DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: A Course on Basic Mathematics.

COURSE DESCRIPTION: Introduction to C Programming; Operators and Expressions; Input and Output Functions; Control Structures; Problem Solving Aspects; Arrays and Strings; Functions; Pointers; Structures and Unions; File Handling.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on C programming constructs to develop programs.
CO2. Design algorithms using problem-solving techniques for given problems
CO3. Apply functions and Arrays to enhance reusability and data manipulation.
CO4. Use pointers to manage the memory effectively.
CO5. Apply Structures, Unions and File handling concepts to develop societal applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO C PROGRAMMING   (9 Periods)

Basics of C Programming: Introduction, Structure of a C program, Concept of a variable, Data types in C, Program statement, Declaration, Storing the data in memory, Tokens, Operators and expressions, Lvalues and Rvalues, Type conversion in C.
Input and Output: Basic screen and keyboard I/O in C, Non-formatted input and output, formatted input and output functions.

UNIT-II: CONTROL STATEMENTS AND INTRODUCTION TO PROBLEM SOLVING
(8 Periods)
Control Statements: Specifying test condition for selection and iteration, Writing test expression, Conditional execution and selection, Iteration and repetitive execution, goto statement, Special control statements, Nested loops.

Introduction to Problem Solving: Algorithms, Flowcharts, Problem solving aspect, Top-down design, Implementation of algorithms, program verification and efficiency of algorithms.

UNIT-III: ARRAYS AND STRINGS, FUNCTIONS   (10 Periods)

Arrays and Strings: One-dimensional array – Declaration, Initialization, Accessing elements, operations; Multi-dimensional arrays – Declaration, Initialization, Working with 2D arrays; Strings – Declaration, Initialization, Printing strings, String input, Character manipulation, String manipulation; Arrays of strings – Initialization, manipulating string arrays.

Functions: Concept of function, Using functions, Call by value mechanism, working with functions, passing arrays to functions, Scope and extent, Storage classes, Recursion.

UNI- IV: POINTERS   (8 Periods)

Pointers in C: Understanding memory addresses, Address operator (&), Pointer – declaration, Initialization, Indirection operator and dereferencing, Void and Null pointers, Use of pointers, Arrays and pointers, Pointers and strings, Pointer arithmetic, Pointers to

pointers, Array of pointers, Pointers to an array, Two-dimensional arrays and pointers, Pointers to functions, Dynamic memory allocation.

UNIT-V: USER-DEFINED DATA TYPES AND FILES (10 Periods)

User-Defined Data Types: Structures - Declaration, Accessing the members, Initialization, typedef and its use, Arrays of structures, Arrays within structure, Structures and pointers, Structures and functions; Unions, Enumeration types, Bit fields.
Files in C: Using files in C, Working with text and binary files, Direct File Input and Output, Files of records, Random access to files of records.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. PradipDey and Manas Ghosh, *Programming in C*, Second Edition, Oxford University Press, New Delhi, 2013.
2. R. G. Dromey, *How to Solve it by Computer*, First Edition, Pearson Education, 2013.

REFERENCE BOOKS:

1. Byron S Gottfried and Jitender Kumar Chhabra, *Programming with C*, Fourth Edition, McGraw Hill Education, 2019.
2. YashavantKanetkar, *Let Us C*, Fifteenth Edition, BPB Publications, 2017.
3. E. Balagurusamy, *Programming in C*, Seventh Edition, McGraw Hill Education Pvt, Ltd, New Delhi, 2017.
4. Behrouz A. Forouzan and Richard F. Gilberg, *Computer Science: A Structured Programming Approach Using C*, Third Edition, Cengage Learning, 2008.

ADDITIONAL LEARNING RESOURCES:

- Learn C Programming - https://www.programiz.com/c-programming
- Learn C Programming - https://www.tutorialspoint.com/cprogramming/index.htm
- C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises
- Basic programming exercises and solutions in C - https://codeforwin.org/2015/05/basic-programming-practice-problems.html

I B. Tech. - I Semester
(20BT12901) DISCRETE MATHEMATICAL STRUCTURES

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	-	-	3

PRE-REQUISITES: A Course on "Transformation Techniques and Linear Algebra".

COURSE DESCRIPTION: Mathematical Logic; Predicates; Relations; Algebra Structures; Mathematical Reasoning; Recurrence Relations; Graphs; Graph Theory and its Applications.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on mathematical logic and predicates.
CO2. Analyze sets using functions and relations.
CO3. Analyze properties of different algebraic structures.
CO4. Apply mathematical reasoning, recurrence relations, permutations and combinations to solve computational problems.
CO5. Apply concepts of graph theory and trees to implement computer applications.

DETAILED SYLLABUS:

UNIT-I: MATHEMATICAL LOGIC AND PREDICATES   (10 Periods)

Mathematical Logic: Statements and notations, Connectives, Well-formed formulae, Truth tables, Tautology, Equivalence of formulae, Normal forms.
Predicates: Predicate calculus, Free and Bound variables, Rules of inference, Consistency, Proof of contradiction and Automatic Theorem Proving.

UNIT-II: FUNCTIONS AND RELATIONS   (9 Periods)

Relations: Properties of binary relations, Equivalence relations, Compatibility relations, Partial ordering relations, Hasse diagram and related applications, Lattice and its Properties.
Functions: Inverse Functions, Composition of functions, Recursive functions.

UNIT-III: ALGEBRAIC STRUCTURES   (7 Periods)

Algebraic System: Examples and General Properties, Semi Groups and Monoids, Groups, Subgroups, Homomorphism and Isomorphism.

UNIT-IV: MATHEMATICAL REASONING AND RECURRENCE RELATIONS (10 Periods)

Mathematical Reasoning: Methods of Proof, Mathematical Induction, Basics of counting, The Inclusion-Exclusion Principle, The Pigeon hole principle, Permutations and Combinations, Generalized Permutations and Combinations.
Recurrence Relations: Generating Functions of Sequences, Calculating coefficients of generating function, Recurrence relation, solving recurrence relations by substitution and Generating functions, Methods of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relation.

UNIT-V: GRAPH THEORY AND ITS APPLICATION   (9 Periods)

Graphs: Introduction to Graphs, Types of Graphs, Graph basic terminology and Special types of simple graphs, Representation of Graphs and Graph Isomorphism, Euler Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs, Euler's Formula and Graph Coloring.

Trees: Introduction to Trees, Properties of Trees, Applications of Trees, Spanning Trees, Counting trees, Depth-First Search, Breadth-First Search, Minimum Spanning Trees.

Total Periods 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. J.P. Trembly and R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science,*Tata McGraw Hill, Thirty Seventh Edition, 2017
2. Kenneth H. Rosen,*Discrete Mathematics and its Applications,* Tata McGraw Hill, Sixth Edition, 2007.

REFERENCE BOOKS:

1. Joe L. Mott and Abraham Kandel, *Discrete Mathematics for Computer Scientists and Mathematicians,* Prentice Hall of India Private Limited, Second Edition, 2004.
2. Ralph P. Grimaldi and B.V.Ramana, *Discrete and Combinatorial Mathematics- an Applied Introduction,* Pearson Education, Fifth Edition, 2006.

ADDITIONAL LEARNING RESOURCES:
- https://www.maa.org/press/ebooks/resources-for-teaching-discrete-mathematics.
- https://www.quora.com/

I B. Tech. – I Semester
(20BT12902) FUNDAMENTALS OF BUSINESS INFORMATION SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Managerial decision making, E-business and Enterprise systems; Spread sheets, Document production software; Databases, Business analytics; Network components, Network types; Operations information systems, Departmental applications.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

CO1. Analyze types of business information systems suitable for E-business and enterprise systems.

CO2. Choose hardware and software for the computer system used in a business.

CO3. Analyzing business data by applying business analytics tools such as OLAP, cube and visualization

CO4. Identify components of communication techniques that are necessary to exchange information within and between businesses.

CO5. Evaluate transaction processing systems, process control and office automation systems for the operational management of a business.

CO6. Assess the potential for using business information systems in different parts of an organization.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BUSINESS INFORMATION SYSTEMS   (10 Periods)

Data and information, creating information, Qualities of information, Knowledge and wisdom, the business environment, Managerial decision making, Knowledge management. Introduction to systems, Different types of systems, Business information systems, Resources that support BIS, Categories of business information system, E-business systems, Enterprise systems, BIS and strategic advantage.

UNIT-II: HARDWARE AND SOFTWARE   (9 Periods)

Components of a computer system, Major categories of computers, Types of microcomputers, Selecting input devices, Selecting output devices, Selecting storage devices, Processors, Categories of software, Document production software, Graphics packages, Spreadsheets, Management applications of productivity software, Multimedia software, Software for using the Internet.

UNIT-III: DATABASES AND BUSINESS INTELLIGENCE   (10 Periods)

Databases: Business-level advantages of databases An overview of the types of database: File processing databases, Database management systems, Relational database management systems, Object-oriented databases, Network and hierarchical databases; Business intelligence, Data warehouses: Data warehouse, Data Mart, Architecture Data mining: Text and Web Mining Business analytics: OLAP, Cube Analysis Case Study: Making business intelligence.

UNIT-IV: NETWORKS, TELECOMMUNICATIONS AND THE INTERNET   (8 Periods)

Computer networks, Network components, Network types, The Internet, Case Study: Asian apps challenge western dominance

UNIT-V: ENTERPRISE AND FUNCTIONAL BUSINESS INFORMATION SYSTEMS
(8 Periods)

Enterprise systems, Operations information systems, Management information systems, Departmental applications, Case Study: Managing the supply chain.

Total Periods: *45*

Topics for self-study are provided in the lesson plan

TEXTBOOKS:

1. Paul Bocij, Andrew Greasley, and Simon Hickie, "Business Information Systems Technology, Development and Management for the E-Business", Fifth edition, Pearson Education Limited, 2015.

REFERENCE BOOKS:

1. R. Kelly Rainer Jr., Casey G. Cegielski, "Introduction to Information Systems Supporting and Transforming Business", Fourth Edition, John Wiley & Sons. Inc, 2012.
2. WitoldAbramowicz, Heinrich C. Mayr, "Technologies for Business Information Systems", Springer, 2007.

ADDITIONAL LEARNING RESOURCES:

1. https://www.edx.org/micromasters/iux-information-systems.
2. https://www.coursera.org/learn/business-model-canvas.

I B. Tech. - I Semester
(20BT1HS31) COMMUNICATIVE ENGLISH LAB
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		-	-	3	1.5

PRE REQUISITE: -

COURSE DESCRIPTION: Just a Minute, Elocution/Impromptu; Phonetics; Vocabulary Building; Grammar; Giving Directions; Role Plays; Public Speaking; Letter Writing; Describing Objects; Listening Comprehension; Information Transfer and Reading Comprehension.

COURSE OUTCOMES: After successful completion of this course, students will be able to:

CO1: Demonstrate knowledge of Phonetics by examining and applying sounds of English through Phonetics.

CO2: Analyze sentence structures by applying and demonstrating knowledge of Vocabulary and Grammar.

CO3: Apply appropriate listening and reading skills by analyzing the context, and demonstrate through listening comprehension and reading comprehension.

CO4: Function effectively as an individual and as a member in diverse teams examining and applying speaking skills in Just A Minute and Role Play.

CO5: Communicate effectively applying appropriate writing and speaking techniques by examining and demonstrating knowledge through Describing Objects, Information Transfer and Letter Writing in formal and real time situations.

First ten exercises are mandatory among the following:

List of Exercises:

1. Just a Minute, Elocution/Impromptu
Steps to be followed – Useful tips – Dos & Don'ts – Preparation – Examples

2. Phonetics
Sounds of English – Consonants – Vowels – Speech Organs – Phonetic Transcription – Word Accent – Basics of Intonation

3. Vocabulary Building
Prefixes & Suffixes – Synonyms & Antonyms – Phrasal verbs – Idioms – One word substitutes – Words often confused

4. Grammar
Tenses –Nouns – Word order and error correction

5. Giving Directions
Useful phrases – Sample conversations - Exercises

6. Role Plays
Useful tips – Dos & Don'ts – Exercises – Role Plays for practice

7. Public Speaking
Stage presence – Voice control – Body Language – Rehearsals – Audience – Delivery - Dos & Don'ts – Project Submission

8. Letter Writing
   Introduction – Objective – Formats – Types – Exercises

9. Describing Objects
   Jargon – Useful Phrases – Do's & Don'ts – Exercises

10. Listening Comprehension
   Introduction – Types of listening – Practice – Benefits of listening – Exercises

11. Information Transfer
   Tables – Pie Charts – Venn Diagrams – Graphs – Flow Charts – Steps to be followed – Exercises

12. Reading Comprehension
   Introduction – Types of reading – Inferring – Critical analysis – Exercises

TEXT BOOK:

1. Communicative English Lab, SVEC

REFERENCE BOOKS:

1. D. Sudha Rani, *A Manual for English Language Laboratories*, Pearson, Noida, 2010.
2. Nira Kumar, English *Language Laboratories*, PHI Learning Pvt. Ltd., New Delhi, 2011.

SUGGESTED SOFTWARES:

1. SoftX
2. Speech Solutions
3. English Pronunciation Dictionary by Daniel Jones
4. Learning to Speak English 8.1, The Learning Company – 4 CDs.
5. Mastering English: Grammar, Punctuation and Composition.
6. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
7. Dorling Kindersley Series of Grammar
8. Language in Use 1, 2 & 3
9. Cambridge Advanced Learner's Dictionary - 3rd Edition
10. Centronix – Phonetics
11. Let's Talk English, Regional Institute of English South India.

ADDITIONAL LEARNING RESOURCES

   1. https://goo.gl/IjE45p: Amazon India site – with thousands of different product descriptions
   2. https://goo.gl/3ozeO6: 15 ways to calm your nerves before giving a presentation.
   3. https://goo.gl/p20ttk: useful site for more language about introducing yourself.
   4. https://goo.glsvMHZ1: information and advice about describing line graphs
   5. https://goo.gl/NqFJuc: an informative presentation about using line graphs

(20BT11231) PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to CSE, CSSE, IT, CSE (AI), CSE (DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		-	-	3	1.5

PRE-REQUISITES: A Course on Programming for Problem Solving.

COURSE DESCRIPTION: Hands on practice in developing and executing programs using C Programming concepts include control statements, arrays, functions, strings, pointers structures and file handling.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyse problems to design suitable algorithmic solutions.
CO2. Apply C programming constructs to develop solutions to the engineering problems.
CO3. Work effectively as an individual to develop solutions based on the user requirements.
CO4. Write and present a substantial technical report/document effectively.

LIST OF EXPERIMENTS:

1. a) Write a C program to perform the arithmetic operations on two integer numbers.
    b) Write a program to evaluate the following expressions by reading the necessary values from the keyboard.
    i. $(ax + b)/(ax – b)$
    ii. $2.5 \log x + \cos 32^0 + | x^2 + y^2|$
    iii. $ax^5 + bx^3 + c$
    iv. ae^{kt}

2. a) Write a C program to find the roots of a quadratic equation.
    b) In a town, the percentage of men is 52. The percentage of total literacy is 48 and the total percentage of literate men is 35 of the total population. Write a C program to find the total number of illiterate men and women if the population of the town is 7000.
    c) The total distance travelled by a vehicle in t seconds is given by the distance $ut+at^2/2$
    where u and a are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of u and a. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of u and a.

3. a) Write a C Program to compute an electricity bill based on the following slab rates.

Consumption units	Rate (in Rupees/unit)
0-100	4.0
101-150	4.6
151-200	5.2
201-300	6.3
Above 300	8.0

    (**Hint**: Take current and old meter readings from the user to get consumption units)
    b) An insurance company computes the premium amount based on the following;
    i. If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city, and is a male then the premium is Rs.4 per thousand and the policy amount cannot exceed Rs.2 lakhs.
    ii. If a person satisfies all the above conditions and is female then the premium is

Rs.3 per thousand and the policy amount cannot exceed Rs.1 lakh.

    iii. If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then premium is Rs.6 per thousand and the policy cannot exceed Rs. 10000.

    iv. In all other cases the person is not insured.

       Write a C program to determine whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

c) Write a C Program to find the grade for a student using a Switch case. The user needs to enter a subject score (varies from 0 to 100)and then display the grade as described below.

Score	Grade	Score	Grade
> = 90	O	>=50 to < 60	D
>=80 to < 90	A	>=40 to < 50	E
>=70 to < 80	B	< 40	Fail
>=60 to < 70	C		

4. a) A Fibonacci sequence is defined as follows:

    The first and second terms in the sequence are 0 and 1. Sub-sequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

b) Write a C program to find the sum of individual digits of a positive integer.

c) Write a C program to read two numbers x and n, and then compute the sum of the geometric progression: $1+x+x^2+x^3+\ldots\ldots+x^n$. Show appropriate error message for $n<0$. (*Example*: if n is 3 and x is 5, then the sum is: 1+5+25+125)

d) Write a C program to print the following pattern.

```
                1
            1   2   1
        1   2   3   2   1
    1   2   3   4   3   2   1
1   2   3   4   5   4   3   2   1
```

5. a) Write a C program to generate all the prime numbers between 1 and n, where n is a value entered by the user. Define a separate function to generate prime numbers.

b) Write C program that uses recursive function to find the following.
    i) Factorial of a given integer   ii) GCD of two given integers

6. a) Write a C program to find both the largest and smallest numbers in a list of integers.

b) Write a C program that uses function to perform the following:
    i) Addition of Two Matrices   ii) Multiplication of Two Matrices

7. a) Write a C program to insert a sub-string in to a main string at a given position.

b) Write a C program to count the lines, words and characters in a given text.

8. a) Write a C program to print the elements of an array in reverse order using pointers.

b) Write a C program to count the number of vowels and consonants in a string using pointers.

c) Write a C program to store n elements in an array and print the elements in sorted order using pointers.

9. a) Write a C program that performs the following operations:
    i. Reading a complex number   ii. Writing a complex number
    iii. Addition of two complex numbers   iv. Multiplication of two complex numbers
    (**Note:** Represent complex number using a structure.)

b) Define a structure to store employee details include *Employee-Number, Employee-Name, Basic-pay, Date-of-Joining.* Write a C program for the following.
 i. A function to store 10 employee details.
 ii. A function to implement the following rules while revising the basic pay.
  If Basic-pay<=Rs.5000 then increase it by 15%.
  If Basic-pay> Rs.5000 and <=Rs.25000 then it increase by10%.
  If Basic-pay>Rs.25000 then there is no change in Basic-pay.
 iii. A function to print the details of employees whohave completed 20 years of service from the Date-of-Joining.

10 a) Write a C program to reverse the first *n* characters of a given text file.

  b) Write a C program to merge two files into a new file.

REFERENCE BOOKS:

1. Byron S Gottfried and Jitender Kumar Chhabra, *Programming with C*, Fourth Edition, McGraw Hill Education, 2019.
2. YashavantKanetkar, *Let Us C*, Fifteenth Edition, BPB Publications, 2017.
3. E. Balagurusamy, *Programming in C*, Seventh Edition, McGraw Hill Education Pvt, Ltd, New Delhi, 2017.
4. PradipDey and Manas Ghosh, *Programming in C*, Second Edition, Oxford University Press, New Delhi, 2013.
5. Behrouz A. Forouzan and Richard F. Gilberg, *Computer Science: A Structured Programming Approach Using C*, Third Edition, Cengage Learning, 2008.

SOFTWARE/TOOLS USED:

- Turbo C++/Dev C++

ADDITIONAL LEARNING RESOURCES:

- C Programming Exercises, Practice, Solution - https://www.w3resource.com/c-programming-exercises/
- Basic programming exercises and solutions in C - https://codeforwin.org/2015/05/basic-programming-practice-problems.html

I B. Tech. – II Semester
(20BT12931) FUNDAMENTALS OF BUSINESS INFORMATION SYSTEMS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: A course on "Fundamentals of Business Information Systems"

COURSE DESCRIPTION: Technical Support documents, Worksheet, Web pages for business, Visualization and functionalities, Survey, Data Sources

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

CO1. Create Spread sheets and technical support documents for business scenarios.
CO2. Design Web pages using HTML for business promotions.
CO3. Identify the functionalities of data visualization tools.
CO4. Create and connect to a data source by conducting a survey and visualize it on desired parameters.
CO5. Work independently and communicate effectively in oral and written forms.

List of Exercises/List of Experiments:

1. Identify the technical support and cost issues that should be considered when evaluating supplier proposals, as a small business organization wishes to purchase a number of personal computers and has issued a tender document to a number of suppliers.
2. Create a worksheet to keep a record of employees of M/s Opportunities Company. Employee details should include Name of Employee, Designation and Basic Salary. Enter 50 records. Calculate Dearness Allowance (DA) as 37.5% of Basic Salary, House Rent Allowance (HRA) 22.5% of Basic Salary, Provident Fund (PF) as 12% of Basic Salary, Gross Salary as Basic Salary + DA+HRA. The Income Tax (IT) as 20% of Gross Salary and Net Salary is Gross Salary – (PF+IT) for each employee. Calculate also Total Salary, Average Salary, Maximum Salary and Minimum Salary paid by the company.
3. Write the HTML code to design a simple website (at least two pages) about your business with the following properties:
   i)   Each page should have appropriate titles.
   ii) The headings should scroll on the page.
   iii) Insert an appropriate image as a background of the web pages.
   iv) The heading of the page should be in RED color and style "Arial". It should be underlined and right aligned.
   v)   The first page should have the information in paragraphs each of which is in different color and alignment.
   vi) The second page should contain a list of the famous tourist spots in that area.
4. Present your own solution for the scenario. You are a newly installed IT manager in a company with 100 staff. You want to convince the directors of the benefits of adopting a local-area network across the whole company.
5. Devise guidelines for the company about the stages that are necessary in the creation of a web site and the management issues involved. You are consultant to a small retailer interested in setting up a transactional e-commerce site.

Data Visualization:

1. Implement the function Filtering, Sorting, Grouping, Hierarchies, Pivot tables on a Data Visualization Software.
2. Conduct a survey in our class and collect information about their goals and interests, visualize it.
3. Consider any data source, connect to it, and visualize for different parameters.
4. Create a survey on employee stress levels in any organization and visualize it.
5. Create a survey on employee emotional intelligence in any organization and visualize it.

REFERENCE BOOKS/LABORATORY MANUALS:

1. Paul Bocij, Andrew Greasley, and Simon Hickie, "Business Information Systems Technology, Development and Management for the E-Business", Fifth edition, Pearson Education Limited, 2015.
2. M. D'Agostino, Dov M. Gabbay, Reiner Hähnle, J. Posegga, "Handbook of Tableau Methods", Springer, 1999.

SOFTWARE/Tools used:

.MS Office
.HTML

ADDITIONAL LEARNING RESOURCES:

1. https://www.edx.org/course/data-visualization-for-all
2. https://www.coursera.org/search?query=data%20visualization&
3. https://www.coursera.org/learn/r-data-visualization
4. https://www.datacamp.com/courses/topic:data_visualization

I B. Tech. – I Semester
(20BT1MC01) UNIVERSAL HUMAN VALUES
(Mandatory Course)
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	-	30	2	-	-	-

PRE-REQUISITES: -

COURSE DESCRIPTION: Process for Value Education; Harmony in the Human Being - Harmony in Myself!; Harmony in Family and Society- Human Relationship; Harmony in the Nature and Existence – Coexistence; Implications of Holistic Understanding of Harmony on Professional Ethics.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand Values and skills for sustained happiness and prosperity.

CO2. Analyse realistic implications of a Holistic understanding of ethical human conduct, trustful and mutually fulfilling human behavior.

CO3. Apply holistic approach in personal life and profession through a positive understanding of the Human reality and existence.

DETAILED SYLLABUS:

UNIT-I: VALUE EDUCATION **(6 Periods)**

Human Values-Introduction; Self-Exploration - Natural Acceptance; Human Aspirations-Right understanding- the current scenario: understanding and living in harmony.

UNIT-II: HUMAN BEING AND SELF **(6 Periods)**

Understanding human being - I' and the material 'Body'; needs of Self ('I') and 'Body'-happiness and physical facility; Body as an instrument of 'I' - characteristics and activities of 'I' and harmony in 'I'; harmony of I with the Body

UNI- III: FAMILY, THE SOCIETY AND THE NATIONS **(6 Periods)**

Values in human relationship (nine universal values) - foundational values of relationship; Difference between intention and competence; Difference between respect and differentiation; harmony in the society; Universal harmonious order in society

UNIT-IV: HARMONY WITH THE NATURE **(6 Periods)**

Harmony in the Nature; Interconnectedness and mutual fulfillment - the four orders of nature - Recyclability and Self-regulation; Existence as Co-existence; Holistic perception of harmony and existence

UNIT-V: HARMONY WITH PROFESSIONAL ETHICS **(6 Periods)**

Acceptance of human values; Ethical Human Conduct; Basis for Humanistic Education; Competence in professional ethics; Case studies: Holistic technologies, Management Models and Production Systems; Socially and ecologically responsible engineers, technologists and managers - enriching institutions and organizations.

Total Periods: 30

Topics for Self-study are provided in the Lesson Plan

TEXT BOOK:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books,New Delhi, 2010

REFERENCE BOOK:

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.

I B. Tech. - II semester
(20BT2BS01) TRANSFORMATION TECHNIQUES AND LINEAR ALGEBRA
(Common to CE, ME, EEE, ECE, EIE, CSE, CSSE, IT, CSE (AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	-	-	3

PRE-REQUISITE: -

COURSE DESCRIPTION: Fourier Series and Fourier Transforms; Laplace Transforms; Inverse Laplace Transforms; Linear Algebra-I (Matrices); Linear Algebra-II (Vector Spaces).

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Apply the knowledge of Fourier and Laplace transform techniques to solve differential equations.

CO2. Analyze linear transformations and associated matrices to solve engineering problems by applying the knowledge of linear algebra.

DETAILED SYLLABUS:

UNIT- I: FOURIER SERIES AND FOURIER TRANSFORMS   (9 Periods)

Fourier series: Determination of Fourier coefficients, Euler's formulae, convergence of Fourier series (Dirichlet's conditions), Fourier series in $(0, 2\pi), (-\pi, \pi)$; Fourier series of even and odd functions; Half-range Fourier sine and cosine expansions in $(0, \pi)$; Fourier integral theorem (statement only), Fourier sine and cosine integrals; Fourier transforms, Fourier sine and cosine transforms, Inverse Fourier transforms.

UNIT-II: LAPLACE TRANSFORMS   (9 Periods)

Definition of Laplace transforms, existence conditions, Laplace transforms of standard functions, Properties of Laplace transforms (without proofs), Laplace transforms of derivatives, Laplace transforms of integrals, multiplication by t^n, division by t, Laplace transforms of periodic functions, Laplace transforms of unit step function and unit impulse function.

UNIT- III: INVERSE LAPLACE TRANSFORMS   (9 Periods)

Inverse Laplace transforms by different methods; Convolution theorem (without proof), inverse Laplace transforms by convolution theorem; Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

UNIT- IV: LINEAR ALGEBRA-I (MATRICES)   (9 Periods)

Rank of a matrix: echelon form; Linear systems of equations: solving system of Homogeneous and Non-Homogeneous equations; Eigen values and Eigen vectors of a matrix and properties (without proofs), Diagonalization of a matrix by orthogonal transformation.

UNIT- V: LINEAR ALGEBRA-II (VECTOR SPACES)   (9 Periods)

Vector spaces, Linear dependence and independence of vectors, basis, dimension, Linear transformations (maps), range and kernel of a linear map, rank and nullity, inverse of a linear transformation, rank-nullity theorem (without proof).

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M. V. S. S. N. Prasad, *Engineering Mathematics-II*, S. Chand & Company, 10th edition, 2016.
2. B. S. Grewal, *Higher Engineering Mathematics*, Khanna publishers, 44th edition, 2017.
3. David Poole, *Linear Algebra: A Modern Introduction*, Brooks/Cole, 2nd edition, 2005.

REFERENCE BOOKS:

1. B. V. Ramana, *Higher Engineering Mathematics*, Tata McGraw hill, 1st edition, 2017.
2. V. Krishna Murthy, Mainra and Arora: *An Introduction to Linear Algebra*, Affiliated East-West Press, 1993.

I B. Tech. – II Semester
(20BT1BS03) ENGINEERING PHYSICS
(Common to CSE, CSSE, IT and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Wave Optics; Electromagnetic Waves; Fiber Optics; Semiconductors; Optoelectronic Devices; Dielectrics; Magnetic materials; Superconductors and Nanomaterials.

COURSE OUTCOMES: After successful completion of the course, a student will be able to:

CO1. Apply the knowledge of light waves to interpret the concepts of Interference, Diffraction and Polarization.
CO2. Demonstrate the concepts of electromagnetic wave propagation in Optical fibers.
CO3. Apply the basic knowledge of semiconductors to understand the functioning of various optoelectronic devices.
CO4. Demonstrate the basic knowledge of dielectric and magnetic properties to understand the various dielectric polarizations and magnetic materials.
CO5. Understand the concepts of superconductors and nanomaterials to familiarize their applications in relevant fields.

DETAILED SYLLABUS:

UNIT-I: WAVE OPTICS (9 Periods)

Interference: Introduction- Interference of light - Theory of interference fringes - Conditions for sustained interference - Interference in thin films (reflected light) - Newton's rings - Determination of wavelength.

Diffraction: Fraunhofer diffraction - Single slit diffraction (qualitative) - Double slit diffraction (qualitative) -Diffraction grating.
Polarization: Polarization by reflection, refraction and double refraction - Nicol's prism - Half wave and Quarter wave plate - Engineering applications of interference, diffraction and polarization.

UNIT-II: ELECTROMAGNETIC WAVES AND FIBER OPTICS (9 Periods)

Divergence, Curl of Electric and Magnetic Fields - Maxwell's Equations (qualitative) - Electromagnetic wave propagation through non conducting medium

Introduction to fiber optics - Total Internal Reflection - Critical angle of propagation - Acceptance angle, Acceptance cone - Numerical Aperture - Classification of fibers based on Refractive index profile, modes - Propagation of electromagnetic wave through optical fiber - Block diagram of fiber optic communication - Applications of an optical fiber - Fiber optic Sensors (temperature, displacement).

UNIT-III: SEMICONDUCTORS AND OPTOELECTRONIC DEVICES (10 Periods)

Introduction - Intrinsic semiconductors - Density of electrons in intrinsic semiconductor - Density of holes in intrinsic semiconductor (qualitative) - Intrinsic carrier concentration - Fermi energy - Electrical conductivity of intrinsic semiconductors - Extrinsic semiconductors- Density of charge carriers in Extrinsic semiconductors (qualitative) - Drift

and Diffusion currents -Direct and Indirect band gap semiconductors - Hall effect, Hall coefficient and Applications - pn junction, Optoelectronic devices: Light Emitting Diode(LED), Photodiode and Semiconductor diode laser.

UNIT-IV: DIELECTRICS AND MAGNETIC MATERIALS   (9 Periods)

Introduction - Electric polarization - Dielectric polarizability, susceptibility and dielectric constant - Types of polarizations (qualitative) - Frequency dependence of polarization - Lorentz (internal) field - Dielectric break down - Piezoelectricity - Applications of dielectrics.

Introduction - Magnetic dipole moment, magnetization, magnetic susceptibility and permeability - Origin of magnetic moment - Classification of magnetic materials - Hysteresis loop - Soft and hard magnetic materials - Applications.

UNIT-V: SUPERCONDUCTORS AND NANOMATERIALS   (8 Periods)

Introduction – Properties of Superconductors - Critical parameters of Superconductors - Meissner effect - Penetration depth - Types of Superconductors - BCS Theory - Josephson effect (AC & DC) - High T_C Superconductors – Applications of Superconductors,.

Basic principles of nanomaterials - Synthesis of nanomaterials by Ball Milling and Pulsed Laser Deposition(PLD) methods - Properties of nanomaterials (Physics, Electrical, Magnetic, Mechanical and Optical) - Applications of nanomaterials.

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1.   M.N. Avadhanulu, P.G.Kshirsagar & T.V.S Arun Murthy, *A Text book of Engineering Physics*, S. Chand Publications, 11th edition, 2019.
2.   P. K. Palaniswamy,*Engineering Physics*, Scitech Publications India Private Limited, 2[nd]edition, 2009.

REFERENCE BOOKS:

1. K. Thyagarajan, *Engineering Physics*, McGraw-Hill Education (India) Pvt. Ltd, 2016.
2. R.K. Gaur and S.L. Gupta, *Engineering Physics*, Dhanpat Rai Publications (P) Ltd, 2015.

I B. Tech. – II Semester

(20BT10201) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CE and CSBS)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	-	-	3

PRE-REQUISITES: -

COURSE DESCRIPTION: Principles of Electrical Systems; AC & DC Machines; Semiconductor Devices and Op-Amps.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyze electrical circuits by applying the conceptual knowledge of circuit concepts.
CO2. Demonstrate knowledge on various generation technologies, protection devices, safety procedures and BEE standards.
CO3. Demonstrate knowledge on characteristics and applications of transformers and AC machines.
CO4. Demonstrate knowledge on characteristics and applications of diode, BJT and Op-amps.

DETAILED SYLLABUS:

UNIT-I: PRINCIPLES OF ELECTRICAL SYSTEMS-I   (9 Periods)

Basic electrical sources: DC-Battery, AC sources–Single loop generator; Single phase and three phase supply; Electrical circuit elements (R, L and C), Ohm's law, Kirchhoff's laws, Representation of sinusoidal waveforms, peak and RMS values, phasor representation, reactive power, apparent power, real power, energy and power factor.

UNIT-II: PRINCIPLES OF ELECTRICAL SYSTEMS-II   (9 Periods)

Significance of Power factor and power factor correction, most economical power factor.Typical layout of electrical grid; Typical layout and operation of Hydro, Thermal and Solar Power Plants; Fuse, circuit breaker (MCB, MCCB, RCCB, ELCB), relay (elementary treatment); Inverter and UPS. Energy Efficiency (Star rating) standards by BEE

UNIT-III: TRANSFORMERS AND MACHINES   (10 Periods)

Construction and working of a single phase transformer, EMF Equation; Construction, working and applications of Permanent Magnet DC Motor, Brushless DC Motor, three phase induction motor; construction, working and applications of stepper motor, resistor start & capacitor start and run single phase induction motor.

UNIT-IV: SEMICONDUCTOR DEVICES   (9 Periods)

PN Junction diode, Characteristics, applications - half wave and full wave rectifier Zener diode, characteristics, application – Regulator. BJT - operation, configurations characteristics

UNIT-V: OP-AMPS   (8 Periods)
Operational Amplifier: Block diagram of Op-Amp, equivalent circuit, Op-Amp AC and DC Characteristics, Inverting and Non-Inverting modes. Applications - Adder, Comparator, Integrator and Differentiator

Total Periods: 45

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. Ashfaq Hussain*, Fundamentals of Electrical Engineering,* Dhanpatrai& Co. (P) Ltd., 3rd edition, New Delhi, 2009.
2. R. L. Boylestad and Louis Nashelsky, *Electronics Devices and Circuits*, PHI, 11th edition, 2009.

REFERENCE BOOKS:

1. M.S. Naidu, S. Kamakshaiah, *Introduction to Electrical Engineering,*Tata McGraw-Hill Education, New Delhi, 2007.
2. D. Roy Chowdhury, *Linear Integrated Circuits*, New Age International Pvt. Ltd., 4th edition, 2011.

I B. Tech. – II Semester
(20BT21501) OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to CSE, CSSE, IT, CSE (AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: A course on Programming for Problem Solving

COURSE DESCRIPTION: Introduction to Object Oriented Programming, Classes and Objects; Inheritance, Packages, Interfaces; Exception handling, Multithreading; Collection Classes; Swings, Event handling.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1: Apply object oriented programming constructs to solve programming problems.

CO2: Design solutions to the problems by using control statements, interfaces, utility classes and Packages.

CO3: Solve real time problems using object oriented programming features – polymorphism, inheritance, exception handling and multithreading.

CO4: Apply multithreading mechanism to enhance the performance of a system.

CO5: Develop user interfaces using GUI programming techniques.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION (9 Periods)

Introduction to Object Oriented Programming, Java Buzzwords, Java Environment, Java Components, Programming Paradigms, Naming Conventions
Classes and Objects: Introduction to classes, objects, Constructors, Garbage Collection, this keyword, Access Control, Features of Object Oriented Programming.

UNIT-II: DATA TYPES, CONTROL STATEMENTS, POLYMORPHISM (9 Periods)

Data Types, Variables, Type Conversions (Boxing and Unboxing/Wrapping and Unwrapping) and Casting, Arrays, Operators, Decision Making Statements, Looping Statements, Methods, Recursion, Method Overloading, Constructor Overloading, Parameter Passing, String Class, Final Keyword.

Utility Classes: String Tokenizer, Scanner, Random, Bit Set.

UNIT-III: INHERITANCE, PACKAGES, INTERFACES (10 Periods)

INHERITANCE: Introduction, Classification, Abstract Classes, Final keyword with Inheritance.

PACKAGES: Basics, Creating and Accessing a package, CLASSPATH, Importing packages.

LAMBDA PACKAGE: Lambda Expression Fundamentals, Functional Interfaces, Block Lambda Expressions, Generic Functional Interfaces, Passing Lambda Expression as Arguments.

INTERFACES: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

UNIT-IV: EXCEPTION HANDLING, MULTITHREADING, COLLECTION FRAMEWORK
(9 Periods)

EXCEPTION HANDLING: Exception, Types of Exception, Keywords: try, catch, throw, throws and finally, Built-in Exceptions, User Defined Exceptions.

MULTITHREADING: Process, Thread, Thread Model, Creating a thread, Priorities, Thread Synchronization, Inter-thread Communication.

COLLECTION FRAMEWORK: FrameworkHierarchy, ArrayList, LinkedList, HashSet.

UNI- V: SWINGS, EVENT HANDLING **(8 Periods)**

SWINGS: Introduction, Features, Hierarchy, Swing GUI Components, Packages in Swings, Swing Control Classes and Methods.

EVENT HANDLING: Event Classes, Event Listener Interfaces - Mouse and Key, Adapter Classes.

Total Periods: 45

Topics for self-study are provided in the lesson plan

TEXT BOOKS:

1. Herbert Schildt, *Java the Complete Reference*, 9th edition, Oracle Press, 2014.

REFERENCE BOOKS:

1. SachinMalhotra and SaurabChoudhary, *Programming in Java*, 2nd edition, Oxford University press, 2014.
2. Y. Daniel Liang, *Introduction to Java Programming,* Pearson Education.
3. T. Budd, *Understanding Object-Oriented Programming with Java,* Pearson Education.

ADDITIONAL LEARNING RESOURCES

https://docs.oracle.com/javase/tutorial/index.html

I B. Tech. – II Semester
(20BT22901) DATA STRUCTURES AND ALGORITHMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: A Course on "Programming for Problem Solving"

COURSE DESCRIPTION: Algorithm Analysis; Linked Lists; Stacks and Queues; Trees; Binary search trees; AVL trees; Heaps; Multiway search trees; Graphs; Sorting and Searching; Hashing

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

CO1. Understand the fundamental concepts of data structures, asymptotic notations and Algorithm analysis techniques to measure the performance of an algorithm.
CO2. Analyze performance of sorting and searching algorithms by making use of time and space complexity.
CO3. Design algorithms to solve societal problems by applying contextual knowledge on linked lists
CO4. Solve computational problems by using stacks and queues
CO5. Apply suitable data structure to perform operations on trees and graphs
CO6. Construct hash tables by using Hash functions and relevant collision resolution technique.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION, SORTING AND SEARCHING   (11 Periods)

Introduction: Introduction to data structures, Introduction to Algorithm, Performance Analysis- Space Complexity, Time Complexity, Asymptotic Notation- Big Oh, Omega, Theta notations.

Sorting: Bubble Sort**,** Insertion sort, Selection Sort and their performance analysis

Searching: Linear Search, Binary Search and their performance analysis

UNIT-II: LINKED LIST   (8 Periods)

Single Linked List, Circular Linked List, Double Linked List, Circular Double Linked List.

UNIT-III: STACKS AND QUEUES   (8 Periods)

Stacks: Introduction, Definition, Implementation of stacks using arrays, Implementation of stacks using linked list, Applications of Stacks
Queues: Introduction, Definition, Implementation of queues using arrays, Implementation of queues using linked list, Circular Queues, Applications of Queues,.

UNIT- IV: TREES, SEARCH TREES   (9 Periods)

Trees: Basic Terminologies, binary trees, Properties of binary tree, Representation of Binary Tree, Binary tree traversals.

Search Trees: Binary Search Trees, Operations on Binary Search Trees, Introduction to AVL Trees and Heap Trees and Its performance Analysis.

UNIT-V: GRAPHS AND HASHING   **(9 Periods)**

Graphs: Introduction, Basic Terminologies, Representation of Graphs, Breadth First Search, Depth First Search.

Multiway Trees: M-way search trees, B-trees, B+-trees and their Complexity Analysis

Hashing: Introduction, Hash Table Structure, Hash Functions, Linear Open Addressing, Chaining and their performance analysis

                                                      Total Periods: *45*

Topics for self-study are provided in the lesson plan

TEXT BOOKS:

1. Debasis Samanta, Classic Data Structures, PHI learning private limited, Second Edition, 2017
2. Narasimha Karumanchi, Data Structures and Algorithms made easy, Career Monk, 5th Edition, 2017

REFERENCE BOOKS:

1. G A V Pai, Data Structures and Algorithms: Concepts, Techniques and Applications,Mcgraw Hill Edition
2. SatrajSahani, Data Structures, Algorithms and Applications in Java, Universities Press, Second Edition, 2008
3. Michael T. Goodrich, Roberto Tamassia, Data Structures and Algorithms in java, Wiley India, Second Edition, 2007

ADDITIONAL LEARNING RESOURCES:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
2. http://nptel.ac.in/courses/106106127/
3. http://www.nptel.ac.in/courses/106102064

I B. Tech. – II Semester
(20BT1BS32) ENGINEERING PHYSICS LAB
(Common to CSE, CSSE, IT and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE REQUISITE: -

COURSE DESCRIPTION: Estimation of thickness of the wire using wedge shape method; Wavelength of monochromatic light source by diffraction grating; Newton's ring method; numerical aperture and acceptance angle of optical fiber; Characteristics of p-n junction diode; Photodiode and LED; Experimental determination of carrier concentration and energy gap of a semiconductor material; Determination resistivity of semiconductor by Four probe method and magnetic field along axial line of a current carrying coil.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Apply the basic knowledge of light waves and semiconductors to demonstrate the functioning of optoelectronic devices.

CO2. Understand the experimental procedures to calculate the thickness of a thin film, Hall coefficient, and acceptance angle of an optical fiber.

CO3. Determine the experimental values of magnetic field induction, wave length of a light source, energy gap of a semiconductor.

CO4. Apply skills to plot characteristic curves to determine the various parameters of semiconductor diodes.

CO5: Work independently and in teams to solve problems with effective communication.

A minimum of any **Ten** experiments are to be conducted among the following:

List of Experiments:

1. Determine the thickness of the wire using wedge shape method.
2. Determination of wavelength of light source by Newton's ring method.
3. Determination of wavelength by plane diffraction grating using spectrometer by minimum deviation method
     4. Estimation of magnetic field along the axis of a circular coil carrying current.
5. Determination the numerical aperture of a given optical fiber and hence to estimate its acceptance angle.
6. Determination of number of charge carriers and Hall coefficients of a given semiconductor using Hall Effect.
7. Determine the energy gap of a semiconductor.
8. Study the I-V characteristics of pn junction diode.
9. Estimation of threshold voltages of different LED's.
10. Study the characteristics of Photodiode.
11. Determination of wavelength of laser by using diffraction grating.
12. Determine the resistivity of semiconductor by Four probe method.

TEXT BOOK:

1. Engineering Physics Lab Manuel (SVEC-20)

REFERENCES BOOKS:

1. S. Balasubramaniah and M.N. Srinivasan, *A Text book of practical physics*, S Chand Publications, 2017.
2. *http://vlab.amrita.edu/index.php* - Virtual Labs, Amrita University

I B. Tech. – II Semester
(20BT21531) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, CSSE, IT, CSE (AI), CSE(DS) and CSBS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: A course on OOPS through Java.

COURSE DESCRIPTION: Hands-on experience on Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling; swings.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1: Apply syntactic constructs of JAVA to solve logic based problems

CO2: Develop application programs using object oriented programming features.

CO3: Solve real time problems using interfaces, packages, Exception Handling, Collection framework and Multithreading.

CO4: Develop GUI Applications using Swings, Event handling mechanisms.

CO5: Work independently and in team to solve problems with effective communication

LIST OF EXERCISES:

COMMAND-LINE ARGUMENTS

1.　　Demonstrate the following programs using command line arguments:
   a　Write a program that computes the sum of all its integer arguments
   b　Write a program to input n integers and perform sorting between them

RECURSIVE FUNCTIONS AND OVERLOADING

2.　a　The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 0, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java program that uses both recursive and non-recursive functions to print
   b　the nth value of the Fibonacci sequence?
   Write and test overloaded methods to find sum of three integers, sum of three double values and sum of four integers.
   c　Write a program to define a class student with name, registration number and marks for three subjects as instance variables and describe a constructor to initialize them. Also define a method display to print all the values.

DATA TYPES (ARRAYS AND STRINGS)

3　a　Write a program to print the element of an array that has occurred highest number of times.
   b　Write a program to count tokens- number of words and characters in a string.

SCANNER AND ABSTRACT CLASSESS

4　a　Write a program that displays a menu with options 1. Add 2. Sub. Based on the options chosen, read 2 numbers and perform the relevant operation. After performing the operation, the program should ask the user if he wants to continue. If the user presses y or Y, then the program should continue displaying the menu
   b　else the program should terminate. [Use Scanner class]
   Write a program to create an abstract class named Shape that contains an empty method named numberofsides ( ). Provide three classes named Trapezoid, Triangle

and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method number Of Sides ( ) that shows the number of sides in the given geometrical figures

5   **PACKAGES AND INTERFACES**

a   Write a program that imports the User-defined package P1 and access the member variables and methods of classes that contained in the package P1.

b   Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

INTERACTIVE DRIVER CLASS

6   A University awards some grace marks to students who participate in the Inter University games. Therefore, total marks awarded = Exam_Marks +Sports_Grace_Marks. If total marks scored are greater than maximum marks, then the final marks awarded will be equal to the maximum marks. An Object Oriented based implementation will contain a class called Results, which extends a class called Exam, which itself extends a class called Student. It will also contain an interface called Sports, which is implemented by the Results class. The Results class will be responsible for computing the final marks scored by the students. Write a Java program along with an interactive driver class.

EXCEPTION HANDLING

7   a   Write a program to handle Arithmetic Exception, Array Out Of Bounds Exception using try and multiple catch statements.

b   Write a java program to throw a user defined exception called Negative, if the entered input is a negative number.

MULTI-THREADING

8   a   Write a Java program that creates three threads. First thread displays - Good Morning for every one second, the second thread displays - Hello for every two seconds and the third thread displays - Welcome for every three seconds.

b   Write a Java program that correctly implements producer consumer problem using the concept of inter-thread communication.

c   Write a java program to implement multithreading using lambda expression.

HASHSET (COLLECTION FRAMEWORK)

9   Write a program create a class "Book" with name, id, author, publisher and quantity as instance variables and a constructor to initialize them. Create a HashSet object of type Book and three Book instances b1, b2 and b3. Add these instances into HashSet and display them.

10   **EVENT HANDLING**

a   Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

b   Write a java program that handles all mouse and key events and shows the event name at the center of the window when mouse event is fired (Use Adapter classes).

REFERENCE BOOKS:

1. Herbert Schildt, *Java the Complete Reference*, Ninth Edition, Oracle Press, 2014
2. SachinMalhotra and SaurabChoudhary, *Programming in Java*, Second Edition, Oxford University Press, 2014.

SOFTWARES/Tools used:

Java SE 12.0.1

ADDITIONAL LEARNING RESOURCES

Problems to be considered from Hackerearth and CodeChef platforms

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: A course on "Data Structures Through C"

COURSE DESCRIPTION: Sorting and Searching; Linked Lists; Stacks and Queues; Binary Search Trees; AVL trees; Graph Traversing Techniques; Collision Resolution Techniques

COURSE OUTCOMES: After successful completion of this course, the students will be able to:
CO1. Implement sorting and searching algorithms using suitable data structure.
CO2. Develop algorithms to solve real time problems using Linked lists
CO3. Solve computational problems using stacks and queues
CO4. Develop algorithms to perform operations on trees and graphs
CO5. Build solution for collisions in hash tables using suitable data structure
CO6. Work independently and in team to solve problems with effective communication

List of Exercises/List of Experiments:

1. Implement following sorting algorithms
   a) Bubble Sort
   b) Insertion sort
   c) Selection sort
2. Store roll numbers of students who attended placement training program in random order in an array.
   a) Write a program to search whether a particular student attended training or not using linear search
   b) Write a program to search whether a particular student attended training or not using binary search
3. **a)** Department of CSSE has readers club named 'Prerana'. Students of all years can be granted membership on request and they can get books. Similarly one may cancel the membership of club. First node is reserved for head of readers club and last node is reserved for in-charge of readers club. The student's information in each node consisting of name of the student and roll no of the student. Develop a program to perform following operations on readers club member's information using singly linked list.
   i) Add and delete the members as well as head or even in-charge.
   ii) Compute total number of members in readers club
   iii) Display members in readers club
   iv) Display list in reverse order using recursion
   v) Sort the list using name and display it.
   b) A Company has N employees and it maintains each employee data with the following attributes like: emp_id, emp-dept,emp_sal, emp_mobileno. Use a menu driven Program to perform following operations on employee's data using DoublyLinked List (DLL).
   i) Create a DLL of N Employees Data by using end insertion.
   ii) Display the status of DLL and count the number of nodes in it
   iii) Perform Insertion and Deletion at End of DLL
   iv) Perform Insertion and Deletion at Front of DLL
   v) Perform Insertion and Deletion at any user specified position of DLL
   vi) Exit
4. a) Implement a menu driven Program for the following operations on stack using arrays.

i) Push an Element on to Stack
ii) Pop an Element from Stack
iii) Demonstrate how Stack can be used to check Palindrome
iv) Display the elements of a Stack
v) Exit
   b) Develop a menu driven program to implement queue operations using arrays
5. a) Write a program to implement stack using linked list
   b) Write a program to implement queue using linked list
6. a) Develop a program to convert an infix expression to postfix expression using stack
   b) Write a program to evaluate given postfix expression using stack
7. Develop a menu driven program to perform the following operations on a binary search tree
      a) Create a binary search tree
      b) Insert an element into a binary search tree
      c) Delete an element from binary search tree
      d) Traverse the binary search tree in In order, Preorder and post order
8. Develop a program to implement Breadth first search traversal.
9. Develop a program to implement Depth first search traversal.
10. Write a program to implement hashing with
      a) Separate Chaining Method
      b) Open Addressing Method

REFERENCE BOOKS/LABORATORY MANUALS:

1. DebasisSamanta, Classic Data Structures,PHI Learning private limited, Second Edition, 2017
2. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education (2008)

ADDITIONAL LEARNING RESOURCES:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
2. http://nptel.ac.in/courses/106106127/
3. http://www.nptel.ac.in/courses/106102064

I B. Tech. - II Semester
(20BT1HSAC) SPOKEN ENGLISH
(Audit Course)
(Common to CSE, CSSE, IT, CSE(AI), CSE(DS) and CSBS

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
-	-	-		2	-	-	-

PRE-REQUISITES: -

COURSE DESCRIPTION: Grammar; Functional English; Paragraph writing; Letter writing and Email writing.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1: Demonstrate knowledge of grammar and vocabulary in writing effective formal letters and e-mails.

CO2: Communicate effectively by applying appropriate speaking and writing techniques by examining and applying functional English.

DETAILED SYLLABUS

UNIT-I: GRAMMAR   (6 periods)

Active voice and Passive voice – Auxiliary modals - Question Forms:Wh-word, Embedded, Yes/No - Disjunctive/Tags - Spotting Errors

UNIT-II: FUNCTIONAL ENGLISH   (6 periods)

Vocabulary Building: (Vegetables, groceries, fruits, Parts of human body, relations) Greetings - Introduction - Self and others - Story telling - Speaking Activities

UNI- III: PARAGRAPH WRITING   (6 periods)

Topic sentence - cohesion and coherence - Unity - adequate development - Introduction to types -Compare-Contrast - Problem & Solution, Cause & Effect, Classification & Illustrative

UNIT-IV: LETTER WRITING   (6 periods)

Components of an Effective Letter - Communication in everyday life - Personal Correspondence, Internal Communication - Career and Employment Letters

UNIT-V: EMAIL WRITING   (6 periods)

Do's & Don'ts - Tips for email effectiveness - Email Jargon - Sample Emails

Total Periods: 30

Topics for Self-study are provided in the Lesson Plan

TEXT BOOKS:

1. L. Adinarayana and V. Prakasam, *Spoken English*, Neelkamal Publications Pvt. Ltd., New Delhi, 2008
2. Ram Bhasker Raju, *The Complete Book on Spoken English*, Goutham Buddha Publications, Hyderabad, 2002.

REFERENCE BOOKS:

1. Sabina Pillai, *Spoken English for my World,* Oxford University Press, New Delhi, 2016.
2. K. R. Lakshminarayanan, *Speak in English,* Scitech Publications, Chennai, 2009.

ADDITIONAL LEARNING RESOURCES

- https://www.britishcouncil.in/programmes/english-partnerships/state/skills-projects/AP-English-Skills.
- https://www.fluentu.com/blog/english/websites-to-learn-english/