SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)

II B. TECH – I SEMESTER	**L**	**T**	**P**	**C**
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6SAH211 **MATHEMATICS – III**
(Common to all Branches)

Course Objectives

- To develop logical thinking in solving various mathematical models
- Emphasis will be more on logical and problem solving development in Numerical methods and their applications
- Train the students thoroughly in Mathematical concepts of partial differential equations
- Introduce the concept of Vector differentiation and integration that finds applications

Course Outcomes

- Students gain knowledge to tackle engineering problems using the concepts of Numerical methods.
- Ability of mathematical modeling of systems using partial differential equations and to solve the partial differential equations
- Understand Curl,divergence and gradient with their applications
- Understand line integral, surface integral and volume integral and correlate them with the applications of Stokes, Greens and Divergence theorem.

UNIT – 1: Solution of Algebraic and Transcendental Equations and Interpolation

Solution of Algebraic and Transcendental Equations: Introduction - The Bisection method - The method of false position - The Iteration method - Newton-Raphson method (Single Variable).

Interpolation: Introduction - Finite differences - Forward differences- Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula.

UNIT – 2: Numerical Differentiation, Numerical Integration and Numerical solution of Ordinary Differential equations

Numerical differentiation, Numerical integration: Trapezoidal rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series - Picard's method of successive approximations - Euler's method - Runge-Kutta methods - Predictor-Corrector method - Milne's method.

UNIT -3: Partial Differential equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions - Method of separation of variables.

UNIT - 4: Vector Differentiation

Introduction to Vector Differentiation , Scalar and Vector point functions- Gradient of a Scalar function - Divergence& Curl of a Vector function and their properties.

UNIT - 5: Vector Integration

Line Integral - Potential function - Area , Surface and volume integrals - Green's , Stoke's and Gauss divergence theorem(excluding their proof) - Verification of Green's, Stoke's and Gaussdivergence theorems.

Text Books:

1. Mathematical Methods, 2012, T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Publishers, New Delhi.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi
3. Introductory Methods of Numerical Analysis, S SSastry, 4/e 2005, PHI Publishers.

Reference books:

1. Engineering Mathematics–I, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, New Delhi.
2. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi
3. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi.
4. Numerical Methods for Scientific and Engineering Computations, 4/e , 2004, M K Jain , S R K Iyengar, R K Jain .
5. A Text Book of Engineering Mathematics, 2011, N.P.Bali, Laxmipublications(P)Ltd, New Delhi.

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II B. TECH – I SEMESTER **L T P C**
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16CSE211 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Objectives:

- The course objective is to discuss fundamental concepts in discrete mathematics with emphasis on their applications to computer science.
- Students should also be exposed to a wide variety of mathematical concepts that are used in the Computer Science discipline.
- Example topics include Logic, Predicate calculus, Relations, Functions, Algebraic structures and Graph theory.

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

- Describe the variations between Statement Logic and Predicate Logic.
- Illustrate the basic terminology of functions, relations, and sets and gain knowledge of their associated operations.
- Solve problems using concepts of spanning tree, Euler circuit, and chromatic numbers.

UNIT - 1: Mathematical Logic:
Statements and Notations - Connectives(Negation, Conjunction , Disjunction, Conditional and Biconditional) - Statements formulas and truth tables - Well-formed formulas, Tautologies - Equivalence of formulas - Duality law - Tautological implications - Normal forms(DNF, CNF , PDNF, PCNF) - Theory of inference for statement calculus: Validity using truth tables - Rules of inference - Consistency of premises and indirect method of proof.

UNIT - 2: Predicate Calculus:
Predicates - The statement function - Variables - Quantifiers - Predicate formulas - Free and Bound variables - The Universe of discourse - Theory of inference for predicate calculus: Valid formulas and equivalences - Some valid formulas over finite universes - Special valid formulas involving quantifiers.

UNIT – 3: Relations &Functions:
Relations: Properties of Binary relations, equivalence - Closure of relations - Compatibility and Partial ordering relations - Hasse diagram - Lattices (Basic Concepts).
Functions: Inverse function - Composition of functions - Recursive functions. Pigeon hole principles and its applications.

UNIT - 4: Algebraic Structures:

Algebraic systems - Examples and general properties - Semi groups - Monoids - Groups and subgroups - Homomorphism and Isomorphism.

UNIT - 5: Graph Theory:

Basic terminology - Multi graphs - Weighted graphs - Digraphs and Relations - Representations of graphs (incidence Matrix, Adjacency Matrix) - Operations on graphs - Isomorphism and sub graphs.

Paths and circuits - Graph traversals(DFS, BFS) - Shortest paths in weighted graphs - Eulerian paths and circuits - Hamiltonian paths and circuits - Planar graph - Graph coloring - Spanning trees - Minimum spanning trees - Krushkal's algorithm - Prim's algorithm.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, 27/e, 2006, J.P. Tremblay and R. Manohar, Tata McGraw Hill Publishers, New Delhi.
2. Elements of Discrete Mathematics – A Computer Oriented Approach, 3/e, 2008, C.L. Liu, D.P. Mohapatra, Tata McGraw Hill Publishers, New Delhi.

REFERENCE BOOKS:

1. Discrete and Combinational Mathematics – An Applied introduction, 5/e, 2008, Ralph. P. Grimaldi, Pearson Education, New Delhi.
2. Discrete Mathematics and its applications, 6/e, 2008, Kenneth H. Rosen, Tata McGraw Hill Publishers, New Delhi.
3. Discrete Mathematics for Computer Science, 4/e, 2007, Gary Haggard, John Schlipf, Sue Whitesides, Thomson Pulication, New Delhi.
4. Discrete Mathematics for Comuter Scientists &Mathematicans, 2/e, 2007, Mott, Kandel, Banker, Prentice Hall India, New Delhi.
5. Discrete Mathematics, 2/e, 2006, Lipschutz, Lipson, Schaum's outlines, Tata McGraw Hill Publishers, New Delhi.

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II B. TECH – I SEMESTER	**L**	**T**	**P**	**C**
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16ECE215 BASIC ELECTRONICS ENGINEERING

Course Objectives:

- The course intends to provide an overview of the principles, operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions
- This course relies on elementary treatment and qualitative analysis and makes use of simple models and equations to illustrate the concepts involved.
- To gain the knowledge on existing on future analog circuits**.**

UNIT -1: JUNCTION DIODES AND CHARACTERISTICS
PN Diode construction and operation, PN Diode Equation, Volt-Ampere (V-I) Characteristics, Ideal Versus Practical Static and Dynamic Resistances, Diode Equivalent circuits, Break down Mechanisms in semiconductor Diodes, Zener Diode Characteristics.

UNIT-2: APPLICATIONS OF PN JUNCTION DIODE
PN Junction as a Rectifier, Half wave rectifier, ripple factor, full wave rectifier, Bridge Rectifier , Capacitor filter, Use of Zener Diode as a Regulator, Series and shunt regulators, UPS.

UNIT -3: TRANSISTOR CHARECTERISTICS
Transistor construction, BJT Operation, BJT Symbol, Transistor as an Amplifier, Common Emitter, Common Base and Common Collector Configurations and their characteristics, Self **Bias circuit, Bias stability.**

UNIT -4: FET CHARECTERISTICS
The Junction Field Effect Transistor (Construction, Principle of Operation, Symbol) - Pinch-Off Voltage – Volt-Ampere Characteristics, FET as Voltage Variable Resistor, Comparison between BJT and FET, MOSFET- Basic Concepts, Construction, modes(depletion & enhancement), symbol, principle of operation, characteristics,Self **Bias circuit, Bias stability.**

UNIT -5: SPECIAL PURPOSE DEVICES
LDR, LED, Photo diodes, Photo Transistor, Operational amplifiers: Ideal operational amplifier, Open loop operation, Feedback inverting and non-inverting, differential amplifier.

Course Outcomes:

- ✓ Know the complete internal structure of PN junction including different types of bias. Acquire sound knowledge about MS junction.

- ✓ Idea about the structure of MOS capacitor. Sound knowledge of MOS transistor including types & structures.
- ✓ Operation of BJT, FET.

Text Books:

1. K .Lalkishore, "Electronic Devices and Circuits", BSP. 2nd edition, 2005.
2. D.Roychoudhury, shailB.Jain ,"Linear Integrated Circuits" 3rd edition, New Age pulishers.

Reference Books:

1. R.L. Boylestad, "Introductory Circuit Analysis", PEARSON,12th edition, 2013
2. N.Salivahanan, and N.Suresh Kumar, "Electronic Devices and Circuits", TMH ,3rd Edition,2012

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II B. TECH – I SEMESTER	**L**	**T**	**P**	**C**
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16CSE212 ADVANCED DATA STRUCTURES

Course Objectives:

The objective of this course is to introduce the fundamentals of Data Structures, Abstract Concepts and how these concepts are useful in problem solving.

Course Outcomes:

After completion of this course student will be able to

- Understand the concepts of object oriented language such as C++.
- Analyze step by step and develop algorithms to solve real world problems.
- Implementing various data structures viz. Stacks,Queues,Linked Lists, Dictionaries and Trees.
- Understanding various pattern matching algorithms and trie techniques.

UNIT - 1: C++ CLASS OVERVIEW

Class & Objects, Class Members, Access Control, Constructors and Destructors, Inline Functions, Static Class Members, this pointer, Friend Functions, Dynamic Memory Allocation and De-allocation (New and Delete).Operator Overloading, Function Overloading, Inheritance Basics, Base and Derived Classes, Inheritance Types, Base Class Access Control, Runtime Polymorphism using Virtual Functions, Generic Programming- Function and Class Templates,

UNIT - 2: REVIEW OF BASIC DATA STRUCTURES

Algorithms - Performance analysis- Time complexity and Space complexity. Review of basic data structures - The list ADT - Implementation using template classes in C++ - Stack ADT - Implementation using template classes in C++ - Queue ADT - Implementation using template classes in C++.

UNIT - 3: DICTIONARIES, HASHING AND PRIORITY QUEUES

Dictionaries - Linear list representation - Skip list representation-Hash Table Representation of Dictionary - Hash Functions - Collision Resolution - Separate Chaining- Open Addressing-Linear Probing -

Quadratic Probing - Double Hashing - Extendible Hashing - Priority Queues - Realizing a Priority Queue using Heaps- Operations - Insertion, Deletion.

UNIT - 4: BALANCED TREES

Binary Search Tree – Operations- Searching, Insertion and Deletion – Implementation using C++ - AVL Trees - Height of an AVL Tree - Operations – Insertion, Deletion and Searching -Red –Black trees Operations – Insertion, Deletion and Searching –B-Trees - Height of a B-Tree –Operations - Insertion, Deletion and Searching.

UNIT - 5: PATTERN MATCHING AND TRIES

Pattern Matching Algorithms: Brute Force Algorithm - Boyer Moore Algorithm –Knuth Morris Pratt Algorithm -Applications - Tries:Standard Tries - Compressed Tries - Suffix Tries – Applications.

TEXT BOOKS :

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
2. Data structures and Algorithms in C++, Wiley student edition, Michael T.Goodrich, R.Tamassia and Mount, John Wiley and Sons. Replica Press Pvt. Ltd., Kundli,2004.

REFERENCES :

1. Data structures and Algorithms using C++, 1/e, Ananda Rao Akepogu and RadhikaRajuPalagiri, Pearson Education, New Delhi.
2. Data structures and Algorithm Analysis in C++, 2/e,Mark Allen Weiss, Pearson Education. Ltd., New Delhi, 2006.
3. Data structures and algorithms in C++, 3/e, Adam Drozdek, Thomson, India Edition, 2005.
4. Data structures using C and C++, 2/e ,Langsam, Augenstein and Tanenbaum, Prentice Hall Inc.New Delhi ,2002.

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16ECE216 DIGITAL LOGIC DESIGN

Course Objectives:

- To familiarize students with different number systems, digital logic, simplification and minimization of Boolean functions.
- To design combinational & sequential digital circuits and state machines.
- To introduce programmable logic devices.

Course Outcomes:

- ✓ Students can design optimized logic circuits through combinational and sequential logic.
- ✓ Students get through knowledge on programmable logic devices.

UNIT - 1: Number Systems & Codes

Review of Number Systems- Binary Arithmetic-subtraction with r and (r-1)'s Complements- Weighted & Non Weighted Codes.

Boolean Algebra : Boolean Theorems-Basic Logic Operations (NOT,OR,AND)-Complement and Dual of Logical Expressions- Universal Gates- EX-OR & EX-NOR Gates- Standard SOP and POS-Minimization of Logic Functions Using Theorems.

UNIT - 2: Minimization of Switching Functions

Minimization of Switching Functions Using K-Map Up to 5 variables- Minimal SOP And POS Realization-Problem Solving Using K-Map for Boolean Functions in SOP and POS Forms.

UNIT - 3: Combinational Logic Circuits & PLD's

Combinational Logic Circuits:

Design of Half Adder - Full Adder - Half Subtractor- Full Subtractor- 4-bit binary adder-4-bit adder Subtractor- BCD adder-carry look ahead adder -Magnitude Comparator – Decoder- Encoder- Multiplexer – De multiplexer.

PLD's:

PROM – PLA – PAL ,Realization of Switching Functions Using PROM - PLA and PAL - Comparison of PROM, PLA, and PAL.

UNIT - 4: Sequential Circuits I

Classification of Sequential Circuits (Synchronous And Asynchronous)-Basic Latches & Flip Flops-SR,D,JK,T –Conversion between Flip Flops- Design of Synchronous and Asynchronous Counters-Design of Shift Registers-Universal Shift Register.

UNIT - 5: Sequential Circuits II

Finite State Machine - Capabilities and Limitations- Analysis of Clocked Sequential Circuits-Design Procedures- Reduction of State Tables and State Assignment-Realization of Circuits Using Various Flip flops - Mealy and Moore State Machines.

Text books:

1. Digital Design, 3/e,2006,Morris Mano,Prentice Hall of India, New Delhi.
2 . Digital Fundamentals, 10/e,2008,ThomasL.Floyd,Pearson/Prentice Hall, New Delhi.

Reference books:

1. Fundamentals of Logic Design, 5/e, 2004,Charles H.Roth ,Thomas Publications, New Delhi.

2. Switching & Finite Automata Theory, 2/e, ,ZviKohavi,Tata McGraw Hill, NewDelhi.

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16CSE213 DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

- Basic knowledge of graph and traversing algorithms.
- Ability to understand and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, Backtracking, Branch and Bound.
- Ability to analyze asymptotic runtime complexity of algorithms including formulating recurrence relations.
- Basic knowledge of computational complexity, approximation algorithms.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze running time of algorithms using asymptotic analysis.
- Describe the divide-and-conquer, dynamic-programming, Greedy, Backtracking and Branch and Bound Techniques and explain when an algorithmic design situation calls for it. Recite algorithms that employ these paradigms. Synthesize various algorithms, and analyze them.
- Differentiate P and NP Class problems.

UNIT - 1: INTRODUCTION

Algorithm - Pseudo code for expressing algorithms - Performance Analysis- Space Complexity - Time Complexity- Asymptotic Notation - Big oh notation - Omega notation - Theta notation and little oh notation.

DISJOINT SETS: Disjoint set operations - Union and find algorithms - Spanning trees - Connected components and Bi-connected components.

UNIT - 2: DIVIDE AND CONQUER

General method - Applications-Binary search - Quick sort - Merge sort- Strassen's matrix multiplication.

GREEDY METHOD: General method –Applications- Job sequencing with deadlines - 0/1 knapsack problem - Minimum cost spanning trees - Single source shortest path problem.

UNIT - 3: DYNAMIC PROGRAMMING

General method –Applications-Matrix chain multiplication - Optimal binary search trees - 0/1 knapsack problem - All pairs shortest path problem - Travelling sales person problem - Reliability design problem.

UNIT - 4: BACKTRACKING

General method – Applications-N-queens problem - Sum of subsets problem - Graph coloring - Hamiltonian cycles.

BRANCH AND BOUND: General method - Applications - Travelling sales person problem - 0/1 knapsack problem- LC Branch and Bound solution - FIFO Branch and Bound solution.

UNIT - 5: NP-HARD AND NP-COMPLETE PROBLEMS

Basic concepts - Non deterministic algorithms - NP - Hard and NPComplete classes - Cook's theorem.

Text Books:

1. Fundamentals of Computer Algorithms , 2/e , Ellis Horowitz , Satraj Sahni and Rajasekharam , Galgotia publications pvt. Ltd , Universities press 2008.
2. Algorithm Design , Foundations , Analysis and Internet examples, 1/e, M.T.Goodrich and R.Tomassia , John wiley and sons, 2002.

References:

1. Introduction to Algorithms , 2/e , T.H.Cormen - C.E.Leiserson - R.L.Rivest and C.Stein , Prentice Hall Inc. Pvt. Ltd./ Pearson Education , 2005.
2. Introduction to Design and Analysis of Algorithms A strategic approach , 1/e, R.C.T.Lee - S.S.Tseng - R.C.Chang and T.Tsai , McGraw Hill, 2005.
3. Data structures and Algorithm Analysis in C++ , 2/e, Allen Weiss , Pearson education , 2006.
4. Design and Analysis of algorithms , 8/e, Aho , Ullman and Hopcroft , Pearson education , 2005.

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16CSE214 ADVANCED DATA STRUCTURES LAB

Course Objectives:

- To make the student learn an object oriented way of solving problems.
- To make the student write ADTS for all data structures.

Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space
- C++ compiler and STL Recommended

Exercise 1:

Write a C++ program to illustrate the following concepts:

a) Class. b) Constructors.

Exercise 2:

Write a C++ program to illustrate the concept of unary and binary Operator Overloading.

Exercise 3:

Write a C++ program to illustrate the following concepts:

a) All types of Inheritance. b) Virtual Functions.

Exercise 4:

Write a C++ program to illustrate the following concepts:

a) Function Templates b) Class Templates

Use Class Templates in the following Programs

Exercise 5 :

Write C++ programs to implement the following using an array.

a) Stack ADT b) Queue ADT

Exercise 6 :

Write C++ programs to implement the following using a singly linked list.

a) Stack ADT b) Queue ADT

Exercise 7 :

Write C++ programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.

Exercise 8 :

Write a C++ program to perform the following operations:

a) Insert an element into a binary search tree.

b) Delete an element from a binary search tree.

c) Search for a key element in a binary search tree.

Exercise 9 :

.Write C++ programs that use non-recursive functions to traverse the given

binary tree in

a)Preorder b) Inorder c) Postorder.

Exercise 10 :

Write C++ programs for implementing the following sorting methods:

a) Merge sort b) Heap sort

Exercise 11 :

.Write a C++ program to perform the following operations

a) Insertion into an AVL-tree b) Deletion from an AVL-tree

Exercise 12 :

Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

Exercise 13 :

Write a C++ program for implementing Knuth-Morris- Pratt pattern matching algorithm.

Exercise 14 :

Write a C++ program for implementing Boyer – Moore Patten matching algorithm

TEXT BOOKS :

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.

2.C++ Programing, 3rd Edition, D.S. Malik, Thomson, Cengage india Pvt. Ltd. Canada, 2007.

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II B. TECH – I SEMESTER	**L**	**T**	**P**	**C**
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16ECE217 BASIC ELECTRONICS ENGINEERING LAB

Course Objectives:

- This Lab provides the students to get an electrical model for various semiconductor devices.
- Students can find and plot V_I characteristics of all semiconductor devices.
- Student learns the practical applications of the devices.

Course outcomes:

- ✓ Students able to learn electrical model for various semiconductor devices.
- ✓ Students can acquire practical knowledge and applications of the semiconductor devices.

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, UJT.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: List of Experiments
(For Laboratory Examination-Minimum of Six Experiments)

1. P-N Junction Diode Characteristics
2. Zener Diode Characteristics
3. Rectifiers (without and with C-filter)
4. BJT Characteristics (CE & CB Configuration)
5. FET Characteristics (CS Configuration)
6. UJT Characteristics
7. CRO Operation and its Measurements
8. CE Amplifier

Equipments required for Laboratory

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes

7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Bread Boards
10. Connecting Wires
11. CRO Probes etc.