

**DETAILED SYLLABUS
FOR
BACHELOR OF TECHNOLOGY**



(THIRD AND FOURTH SEMESTER)

**COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT**

NATIONAL INSTITUTE OF TECHNOLOGY

AGARTALA
Computer Science & Engineering – 3rd Semester

Theoretical Subjects:						
Sl. No.	Subject	Subject Code	Contact Period/week			Credits
			L	T	P	
1.	Mathematics - III	M-301	3	1	0	8
2.	Engineering Economics & Costing	HSS-301	4	0	0	8
3.	Digital Circuits & Logic Design	CSE-301	3	1	0	8
4.	Computer Programming	CSE-302	3	1	0	8
5.	Data structures	CSE-303	3	1	0	8
6.	Digital Circuits & Logic Design Lab	CSE-304	0	0	2	2
7.	Computer Programming Lab	CSE-305	0	0	3	3
8.	Data structures Lab	CSE-306	0	0	3	3
Total			16	4	8	48

N.B.: L- Lectures , T- Tutorials , P - Practicals

Total : Lectures = 16 ; Tutorials = 4 ; Practical= 8

Total Credits= 48

Computer Science & Engineering – 4th Semester

Theoretical Subjects:						
Sl. No.	Subject	Subject Code	Contact Period			Credits
			L	T	P	
1.	Mathematics - IV	M-401	3	1	0	8
2.	Management & Managerial Economics	HSS-401	4	0	0	8
3.	Microprocessor And Applications	CSE-401	3	1	0	8
4.	Discrete Computational Structures	CSE-402	2	1	0	6
5.	Linear Integrated Circuits	CSE-403	2	1	0	6
6.	Object Oriented Programming	CSE-404	3	1	0	8
7.	Microprocessor Lab	CSE-405	0	0	2	2
8.	Linear Integrated Circuits Lab	CSE-406	0	0	2	2
9.	Object Oriented Programming	CSE-407	0	0	3	3
Total			17	5	7	51

N.B.: L- Lectures , T- Tutorials , P - Practicals

Total : Lectures = 17 ; Tutorials = 5 ; Practical= 7

Total Credits= 51

**COMPUTER SCIENCE
AND
ENGINEERING DEPARTMENT**

SYLLABUS FOR B.TECH. THIRD SEMESTER

MATHEMATICS-III
(M-301)

Contact Periods:
(3L + 1T) Per Week
Credits: 8

Classical and Axiomatic construction of the theory of Probability, Conditional Probability and basic formulae, random variables, probability density function and probability distribution function, functions of a random variable. Standard univariate discrete and continuous distributions and their properties. Mathematical expectations, moments, moment generating function. Multivariate distributions, marginal and conditional distributions, conditional expectations.

Fourier Series, Half range Series.

Series solution of ordinary differential equation of second order. Ordinary points and regular singular points.

Methods of least squares and curve fitting.

Partial derivatives, Chain Rule, Differentiation of implicit functions, exact differentials. Tangent planes and normal. Maxima, Minima, and Saddle points. Simple problems in extrema of functions with constraints. Method of Lagrange multipliers.

Multiple- double and triple integrals. Jacobians and transformation of co-ordinates. Applications to areas, volumes, centre of pressure. Improper integrals. Test of convergence. Beta and Gamma functions.

Vector differentiation and Integration. Gradient, divergence and Curl-applications.

Functions of complex variable. Limits and Continuity Differentiations. Analytic functions. Cauchy-Riemann equations, Conjugate functions; application to two dimensional problems, Cauchy's Integral theorem; Taylor's and Laurent's expansions; Branch points Zeros, Poles, residues. Simple problems on contour integration.

RECOMMENDED TEXT BOOKS:

1. Engineering Mathematics- Kreyszig
2. Engineering Mathematics- B S Grewal
3. Engineering Mathematics- S Das

ENGINEERING ECONOMICS AND COSTING
(HSS-301)

Contact Periods:
(3L + 1T) Per Week
Credits:8

PART-A

INTRODUCTION:

Definition of Economics, Subject matter, Scope and nature of Economics, Engineering Economics and its importance, Basic Concepts, Goods, utility, wealth, value, consumption, human wants.

DEMAND AND SUPPLY:

Concept Law and Elasticity, Determinant of elasticity, measurement of elasticity.

THE THEORY OF PRODUCTION AND COST:

Factors of production function, marginal products, Law of variable proportions, Returns to scale. Accounting cost and Economics costs.

THEORY OF FIRM AND PRICING IN VARIOUS MARKET STRUCTURES:

Meaning of market, determination of output , revenue and profit in perfect and imperfect competitions.

NATIONAL INCOME, MONEY AND BANKING , INFLATION:

Concept of measurement of National income; Function of money, central Bank, its functions, balance sheet and essential of sound Banking. Meaning of inflation and deflation, methods of control.

ECONOMIC REFORMS, GROWTH AND DEVELOPMENT:

Rationale of Economic Reforms in India, Meaning of Growth and Development, Concept of Planning, Economic systems – Capitalism , Socialism and Mixed Economy,.

PART-B

DOUBLE ENTRY SYSTEM OF BOOK KEEPING:

Journal and ledger, Cash Book. Practical problems.

FINAL ACCOUNTS:

Trading account, profit and loss account, balance sheet. Practical Problems.

BANK RECONCILIATION STATEMENT:

Practical Problems.

MANUFACTURING ACCOUNT:

Practical Problems.

ELEMENTS OF COST:

Direct Materials, direct labour, direct expenses, overheads- production, office and administration, selling and distribution. Practical Problems.

MACHINE HOUR RATE AND LABOUR HOUR RATE:

Practical Problems.

MAINTENANCE OF STORES:

Bin Card, store ledger, LIFO, FIFO, simple and weighted average, standard cost method. practical problems.

BOOKS RECOMMENDED:

1. Cost Accountancy- by Bose and Das.
2. Cost Accountancy- by B . Banerjee.
3. Monetary and fiscal Economics – P. R Krishna Aiyer.
4. Industrial Organization and Engineering Economics- by T R Banga and S C Sharma.

DIGITAL CIRCUITS & LOGIC DESIGN
(CSE-301)

Contact Periods:
(3L + 1T) Per Week
Credits:8

NUMBER SYSTEMS AND CODES :-

Digital Systems : Number Systems- Binary, Decimal ,Octal and Hexadecimal.
Number Base conversion, Complements, Binary Codes, Binary Logic.

BOOLEAN ALGEBRA & LOGIC GATES:

Basic Definitions : Axiomatic definition of Boolean algebra , basic theorems and properties of Boolean algebra, Boolean functions , canonical & standard forms , other logic operations , digital logic gates.

SIMPLIFICATION OF BOOLEAN FUNCTIONS :

The map method , sum of products simplification , product of sums simplification, don't care conditions, NAND and NOR implementations, The tabulation method, Determination of prime implicants, selection of prime-implicants.

COMBINATIONAL LOGIC DESIGN PRINCIPLES:

Switching Algebra. Combinational Circuit Analysis. Combinational Circuit Synthesis. Programmed Minimization Methods. Timing Hazards.

COMBINATIONAL LOGIC DESIGN PRACTICES:

Documentation Standards. Circuit Timing. Combinational PLDs (PLAs; PALs; GALs; Bipolar PLD Circuits; CMOS PLD Circuits; Device Programming and Testing). Decoders. Three-State Buffers. Encoders. Multiplexers. Exclusive OR Gates and Parity Circuits. Comparators. Adders, Subtracters, and ALUs. Combinational Multipliers.

SEQUENTIAL LOGIC DESIGN PRINCIPLES:

Bistable Elements. Latches and Flip-Flops. Clocked Synchronous State-Machine Analysis. Clocked Synchronous State-Machine Design. Designing State Machines Using State Diagrams. State-Machine Synthesis Using Transition Lists. Another State-Machine Design Example. Decomposing State Machines. Feedback Sequential Circuits, VHDL Sequential-Circuit Design Features.

SEQUENTIAL LOGIC DESIGN PRACTICES:

Sequential Circuit Documentation Standards. Latches and Flip-Flops. Sequential PLDs. Counters. Shift Registers. Iterative versus Sequential Circuits. Synchronous Design Methodology. Impediments to Synchronous Design. Synchronizer Failure and Metastability Estimation.

MEMORY, CPLDS, AND FPGAS:

Read-Only Memory. Read/Write Memory. Static RAM. Dynamic RAM. Complex PLDs. FPGAs.

DIGITAL INTEGRATED CIRCUITS:

Introduction to digital logic families, RTL and DTL circuits, integrated injection – logic , transistor logic, emitter coupled, Metal Oxide Semiconductor, complementary MOS.

ANALOG TO DIGITAL & DIGITAL TO ANALOG CONVERTERS:

Study to different types of analog to digital and digital to analog converters , their resolution, conversion time, sensitivity, accuracy and other parameters.

BOOKS RECOMMENDED :

1. M. Morris Mano, Digital Logic & Computer Design , PHI
2. T.C. Bartee, Digital Electronic Circuits, Mcgraw Hill Inc.
3. D.P. Malvino and Leach, Digital Electronics Principles, Mcgraw Hill Inc.
4. R.P. Jain Modern Digital Electronics.
5. John F Wakerly, “*Digital Design Principles and Practices 3/e*”, Pearson Education (2001)
6. J P. Hayes, “*Introduction to Digital Logic Design*”, Addison-Wesley Publishing Co.,

COMPUTER PROGRAMMING

(CSE-302)

Contact Periods:
(3L + 1T) Per Week
Credits:8

WRITING A SIMPLE PROGRAM:

Learning the form of a C program, Declaring variables, designing program flow and control, defining and using functions, using standard terminal I/O functions.

FUNDAMENTAL DATA TYPES AND STORAGE CLASSES:

Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external.

OPERATORS AND EXPRESSIONS:

Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity.

CONDITIONAL PROGRAM EXECUTION:

Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch.

PROGRAM LOOPS AND ITERATION:

Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue.

MODULAR PROGRAMMING:

Passing arguments by value, scope rules and global variables, separate compilation, and linkage, building your own modules.

ARRAYS:

Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size.

STRUCTURES:

Purpose and usage of structures, declaring structures, assigning of structures.

POINTERS TO OBJECTS:

Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, defining and using stacks and linked lists.

UNIONS:

Components in overlapping memory, declaring and using unions .h vs. private .c files, Hiding private variables and functions.

CONTROLLING DEVICES:

Bit access and masking, pointing to hardware structures.

OPERATING SYSTEM INTERACTION:

Reading command line arguments, creating and accessing files, file opening modes, formatted disk I/O.

THE STANDARD C PREPROCESSOR:

Defining and calling macros, utilizing conditional compilation, passing values to the compiler.

THE STANDARD C LIBRARY:

Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sin, alike Other Standard C functions.

BOOKS AND REFERENCES:

1. Herbert Schildt, Complete reference in C," TMH
2. Yashwant Kanetkar," Let US C", BPB
3. Balaguruswamy, "Programming in ANSI C," TMH
4. Yashwant Kanetkar Pointers in C
5. Graphics Under C by Yashwanth Kanetkar
6. Kernighan, Brian W. & Ritchie, Dennis M., *The C Programming Language*. Second edition, 1988, Prentice Hall,
7. Programming with C by Byron Gottfried
8. ANSI C by E. Balaguruswamy
9. C: How to Program, by H.M Deitel, P.J. Deitel, Harvey M. Deitel

DATA STRUCTURES **(CSE-303)**

Contact Periods:
(3L + 1T) Per Week
Credits:8

INTRODUCTION:

Data Structure Definition, Survey of different types of data structure.

ARRAYS:

Representation of arrays, Ordered bits and their arrays, Sparse Representation.

STACKS AND QUEUES:

Fundamental of stacks and queues , Representation with arrays, circular queue, Multiple stacks and queues dynamics.

LINK LISTS:

Singly linked list and their manipulation, storage pool , linked list, Dynamic storage management, Garbage collection, generalized list, Linked stacks and queues.

TREES:

Binary trees and its representation arrays, Linked binary tree traversal, Threaded binary tree, Binary tree representation of tree.

SORTING AND SEARCHING:

Searching – linear and binary search , different algorithms for sorting and merging.

SYMBOL TABLES:

Static tree tables, Dynamic tree tables, Hashing techniques for symbol table organization.

Interrelationship of Data Structure and algorithms.

RECOMMENDED BOOKS:

1. An Introduction To Data Structures With Applications, Tremblay J.P. and Spreason P.J , Tata Mcgraw Hill
2. 'Fundamentals Of Data Structures' , Horowitz S. and Sahani S. , Computer Science Press.

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SYLLABUS FOR THIRD SEMESTER

Sessional

DIGITAL CIRCUITS AND LOGIC DESIGN LAB (CSE-304)

CREDITS: 2

L T P
0 0 2

PRACTICALS:

1. To see the working of a BCD-to-7 Segment decoder and to verify the truth table.
2. To study the operation of Arithmetic and logic unit using IC.
3. To construct different types of flip-flops and verify their truth tables. Flip-flops like J-K flip-flops. S-R flip-flop. And D-flip-flop etc.
4. To construct and verify a Master-Slave flip-flop.
5. Construction and study of Modulo-N counter using IC's 7490 decade counter, 7493 binary counter.
6. Study of various Interfacing card
 - 12-bit high-speed data acquisition card.
 - PC Bus Extension unit.
 - 16-bit channel Relay output card.
 - Digital IC tester.
 - 7-Segment display card.
 - Amplifier and multiplexer card.
 - Digital I/O and timer counter card.

This is only the suggested list of practicals. Instructor may frame additional practicals relevant to the course contents

COMPUTER PROGRAMMING LAB(CSE- 305)

CREDITS: 3

L T P
0 0 3

PRACTICALS:

At least Twenty (20) programs to be written & tested by running in computer covering theoretical syllabus in C (CSE- 302)

DATA STRUCTURES(CSE-306)

CREDITS: 3

L T P
0 0 3

PRACTICALS:

Use of various data structure available in PASCAL and C language for solving no. of problems, may be simple mathematical problems based on the system programming.

Use and selection of appropriate data structures from the available data structures like- STACK, QUEUE, LINKED LISTS, DOUBLY LINKED LISTS, CIRCULAR QUEUES etc.

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SYLLABUS FOR B. TECH. FOURTH SEMESTER

MATHEMATICS –IV
(M-401)

Contact Periods:
(3L + 1T) Per Week
Credits:8

OPERATION RESEARCH:

n-tuples of real nos, addition and scalar multiplication of vectors, Convex combination, Linearly dependence and independence, basic and dimension, Linear programming, concept of Simplex method, duality, two-phase method, Dual-Simplex, Transportation and assignment models.

NUMERICAL ANALYSIS:

Solution of Algebraic and transcendental equation by bisection method, iteration method, Regular- Falsi (False position) method, Newton-Raphson method, Complex roots by Lin-Bairstow method, Solution of simultaneous linear equation by Gauss Elimination and gauss –Seidal method.

PARTIAL DIFFERENTIAL EQUATION:

Solution by separation of variables, Wave equation, heat equation, One and two dimension heat flow.

INTERPOLATION:

Concept of interpolation, Difference operators, Divided Difference interpolation, newton's forward, backward, interpolation, Lagrange's interpolation, Starling and Bessel's interpolation, numerical differentiation (1st and 2nd order), Numerical integration (Trapezoidal, Simpson's one- third,three-eight, Weddle's rule).

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATION :

Taylor's method, Picard's method, Runge's method, Runge-kutta's method, Euler's method and Euler's modified method.

RECOMMENDED TEXT BOOKS:

- 1.Engineering Mathematics- Kreyszig
2. Engineering Mathematics- Agrawal
3. Engineering Mathematics- Das

MANAGEMENT & MANAGERIAL ECONOMICS
(HSS-401)

Contact Periods:
(3L + 1T) Per Week
Credits:8

PART-A

BASIC CONCEPTS AND FUNCTIONS OF MANAGEMENT:

Planning: Nature, Purpose and Objectives of planning, organizing: Nature and purpose, Authority and Responsibility, Staff Bug, Supply of Human Resources, performance Appraisal, Controlling: System and Process of controlling, control Techniques.

HUMAN RESOURCE MANAGEMENT & MARKETING MANAGEMENT:

Nature and scope of human resource planning, Training and development, Recruitment and selection, career growth, Grievances, Motivation and its types, needs for motivation, Reward and Punishment, Models for motivation, Leaders:Kind of Leader, Leadership styles, Roles and function of leaders, Conflict management, Kinds and cause of conflict, Settlement of conflict, Group and team working, Organizational design and development.

MARKETING ENVIRONMENT:

Consumer Markets and Buyer behavior marketing Mix, Advertising and Sales promotion, Channels of Distribution

FINANCIAL MANAGEMENT:

Need of Finance, Kind and sources of capital, Shares & debentures, Fixed and working capital, Capital structure of a firm, Operating and Financial Leverage, EBIT, EPS Analysis. Functional ratio Analysis: Uses and nature, Liquidity coverage ratios, Practical problems.

INVESTMENT DECISIONS AND FORECASTING OF WORKING CAPITAL:

Kinds of capital budgeting decisions, evaluation of proposal, Capital discounting and non-discounting based method, Practical problem, definition and importance of working capital. Working capital operating cycle, factors affecting working capital,Inventory management introduction to cash and receivables management. Practical problems.

PART-B

COST AND COST CONTROL: Elements of costs, Types of Costs-direct and indirect, Variable and fixed, labour cost, Material cost, Over head Cost. Cost control techniques, Budgets-meaning, kinds, budgetary control, break-even analysis, practical problems.

BASIC CONCEPTS AND ECONOMIC FORECASTING: INTRODUCTION:

Definition, meaning, subject matter and scope of business economics or managerial economics. Demand analysis and forecasting, demand estimation methods.

GAME THEORY AND PRICING: Game theory and strategic behavior, Pricing: Determinants of price, pricing under different market structures, perfect competition monopoly and monopolistic competition, pricing methods in practice, peak load pricing, cost plus or mark up pricing.

RISK AND CAPITAL BUDGETING: Risk and Decision making, Risk Management, Decision Tree Analysis, Capital Budgeting : meaning, process, the cost of capital, mergers and acquisitions, evaluation of investment decisions, Break Even Analysis.

TEXT BOOK AND REFERENCES:

1. M. Y. Khan and P. K. Jain, “ Financial Management:, Tata Mcgraw Hill, 1997.
2. Y. K. Bhusan, “ Fundamentals Of Business Organizations and Management ”, S. Chand and Sons, 1998.
3. Philip Kotler , “ Marketing Management” , Prentice Hall Of India, 1997.
4. Chandra Prasanna, “ Fundamentals Of Financial Management:, Tata Mcgraw Hill,1994.
5. Fred Luthans, “ Human Resource and Management”, Tata Mcgraw Hill,1997.
6. Stephen P Rabbins, “ Organizational Behavior Concepts, Controversies and Applications:, Prentice Hall, Englewood Cliff, New Jersey 1998.
7. Craig H Peterson,” Managerial Economics”, Pearson Education.
8. Suma Damodaran, “ Managerial Economics”, Oxford University Press.
9. D. N. Dwivedi’s “Managerial Economics”, Vikash Publishing House Pvt. Ltd.

MICROPROCESSOR AND APPLICATIONS

(CSE-401)

Contact Periods:
(3L + 1T) Per Week
Credits: 8

INTRODUCTION :

Evolution of microprocessors; iAPX/nn Microcomputer family; Introduction to various types of processors viz Microprocessors, Bit-sliced & Microcontrollers. Intel 8085 Microprocessor Architecture and its operation; Interfacing Devices; Introduction to Interfacing Memory and Input/Output devices.

INSTRUCTIONS & TIMINGS :

Instruction Classification and Format, Instruction timings and operation status, Introduction to 8085 instruction set; Data transfer instructions, Arithmetic and logical operations, Branch operations, Advanced Instructions.

PROGRAMMING INTEL 8085 MICROPROCESSOR :

Machine Language Programming, Assembly Language Programming, Debugging a Program, Programming Techniques viz Counting, Looping, Indexing, Stack operations and Subroutines.

INTERRUPT MANAGEMENT :

Intel 8085 interrupts, Different types of Interrupts, Interrupt Service Routines, Enabling and disabling Interrupts, Interrupt Vectors, Typical Interrupt Acknowledgment & Response

PARALLEL INPUT/OUTPUT AND INTERFACING :

Basic Interfacing Concepts, Types of I/O, Interfacing Output Displays and Input Keyboards, Memory Mapped I/O and Interfacing Memory.

GENERAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES:

Basics in Programmable I/Os, Intel 8255 Programmable Peripheral Interface, Intel 8253 Programmable Interval Timer, Intel 8155 and Intel 8755 Multipurpose Programmable Devices; Interfacing, Initialization, Programming typical Applications of all the devices.

SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES :

Interfacing Intel 8279 Programmable Keyboard/Display; Intel 8259 Programmable Interrupt Controller, modes; Intel 8257 DMA Controller, modes; Interfacing, Initialization, Programming typical Applications of all the devices.

SERIAL DATA COMMUNICATION :

Serial I/O, Software Controlled Asynchronous Serial I/O, Hardware Controlled Serial I/O; Synchronous Serial Communication; Intel 8250 UART & Intel 8251 USART interfacing, initialization, programming applications.

TYPICAL ADVANCED APPLICATIONS OF MICROPROCESSOR :
Interfacing with ADC & DAC. Designing typical Microprocessor System,
Development and Troubleshooting Tools.

BOOKS RECOMMENDED:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085", 5/E, Penram International Publishing (India) Pvt. Ltd., Reprint 2006.
2. R. Theagarajan, S. Dhanasekaran, S. Dhanapal, "MicroProcessor & It's Applications", New Age International Publishers, Reprint 2007. "
3. Microprocessor, Leventhal

DISCRETE COMPUTATIONAL STRUCTURES

(CSE-402)

Contact Periods:
(3L + 1T)Per Week
Credits: 8

PROPOSITIONAL CALCULUS:

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan’s Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.

PREDICATE CALCULUS:

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

SET THEORY :

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sublattices – Boolean algebra – Homomorphism.

FUNCTIONS:

Definitions of functions – Classification of functions –Type of functions - Examples – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of a set – Hashing functions – Recursive functions – Permutation functions.

GROUPS:

Algebraic systems – Definitions – Examples – Properties – Semigroups – Monoids – Homomorphism – Sub semigroups and Submonoids - Cosets and Lagrange’s theorem – Normal subgroups – Normal algebraic system with two binary operations - Codes and group codes – Basic notions of error correction - Error recovery in group codes.

UNIT VI:

Monoids and groups: Groups Semigroups and monoids Cyclic semigroups and submonoids, Subgroups and Cosets. Congruence relations on semigroups. Morphisms. Normal subgroups. Structure of Cyclic groups permutation groups, dihedral groups Elementary applications in coding theory.

UNIT VII:

Rings and Boolean algebra : Rings Subrings morphism of rings ideals and quotient rings. Euclidean domains Integral domains and fields Boolean Algebra direct product morphisms Boolean sub-algebra Boolean Rings Application of Boolean algebra in logic circuits and switching functions.

TEXT BOOKS

1. Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.
2. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Fourth Edition, Pearson Education Asia, Delhi, 2002.

REFERENCES

1. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, “Discrete Mathematical Structures”, Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
2. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.
3. Richard Johnsonbaugh, “Discrete Mathematics”, Fifth Edition, Pearson Education Asia, New Delhi, 2002.
4. Ehrig, H., Mahr, B. Fundamentals of Algebraic Specification I, EATCS
5. Monographs on Theor. Comp. Sc. Vol. 6 spinger, Berlin 1985.
6. Gersting J. Mathematical Structures for Computer science, W. H. Freeman, New York, 1987.
7. Gibbons, A. Algorithmic Graph theory Cambridge Cambridge University Press, 1985.
8. Knuth, D. E. The art of Computer Programming Vol I: Fundamental Algorithms. 2nd ed. Reading,

Mass, Addison Wesley 1973.

Kolman B. Busby R. discrete Mathematical Structures for Computer Science, Prentice Hall Englewood Cliffs. 1987.

Sahni , S. Concepts in discrete Mathematics Fridley MN., Camelot Publ. Comp., 1981.

Schmidt G. Strohlein T. Relations Graphs Program, EATS Monograph on Theor. Comp. Sc. Vol. 29 Berlin Spinger 1993.

Weehler W. Universal Algebra for computer Scientist EATCS Monographs on Theor. Comp. Sc. Vol. 25 Spinger-Verlag, Barlin 1991.

LINEAR INTEGRATED CIRCUIT **(CSE-403)**

Contact Periods:
(3L + 1T)Per Week
Credits: 8

OPERATIONAL AMPLIFIERS:

Introduction, Characteristics, Various differential amplifiers , Pin configuration, power supply requirement, parameters of amplifier, Inverting , Non Inverting and differential configuration, Adder, Sub-tractor, current to voltage converter, voltage to current converter, comparator , Zero crossing detector, Window detector.

MULTIVIBRATORS:

Astable monostable and bistable multivibrators using IC's and transistors.

TIMER:

IC-555, Its Characteristics and applications.

WAVE SHAPING:

Elementary idea of linear and non-linear wave shaping, Clamping and clipping theorem and its applications, integrators and differentiators.

OSCILLATORS AND AMPLIFIERS:

Concept of feedback, Its advantages and disadvantages, different types of Oscillators and Amplifiers.

TRANSDUCERS:

Introduction, Types, Commercial applications.

BOOKS RECOMMENDED:

1. Operational amplifiers and Applications:--R.Gaykwad.
2. Pulse Digital and Switching Waveforms—Millman. Taub.
3. Integrated Circuit:-K.R.Botkar.
4. Electronics measurement and Instrumentation Techniques—D. Cooper.

OBJECT ORIENTED PROGRAMMING

(CSE – 404)

Contact Periods:
(3L + 1T) Per Week
Credits: 8

PRINCIPLES OF OBJECT ORIENTED PROGRAMMING:

A Look at Procedure-Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of Object Oriented Programming, Benefits of OOP, Object Oriented Languages

TOKENS, EXPRESSIONS AND CONTROL STRUCTURES:

Tokens, Keywords, Identifiers and Constants, Basic Data Types, User-Defined and Derived Data Types, Type Compatibility, Reference, Variables, Scope Resolution Operator, Type Casting, Implicit Conversion, Operator Precedence, Control Structures, Structure, Function.

CLASSES AND OBJECTS:

class specification, class objects, accessing class members, data hiding, empty classes, pointers within a class, passing objects as arguments, returning objects from functions, friend functions and friend classes, constant parameters and member functions, structures and classes, static members, objects and memory resource, class design steps.

OBJECT INITIALIZATION AND CLEANUP:

Constructors, destructor, constructor overloading, order of construction and destruction, constructors with default arguments, nameless objects, dynamic initialization through constructors, constructors with dynamic operations, constant objects and constructor, static data members with constructors and destructors, nested classes.

OPERATOR OVERLOADING AND TYPE CONVERSION:

Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary Operators Using Friends, Manipulation of Strings Using Operators, Rules for Overloading Operators, Type Conversions

INHERITANCE: EXTENDING CLASSES:

Deriving Derived Classes, Single, Multilevel, Multiple, Hierarchical, Hybrid Inheritance, constructors & destructors in derived classes, constructors invocation and data members initialization, Virtual Base Classes, Abstract Classes, delegation.

POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM:

Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Implementation of run-time polymorphism, Pure Virtual Functions.

WORKING WITH FILES:

Classes for File Stream Operations, Opening and Closing a File, File Pointers and their Manipulations, Sequential Input and Output Operations, Error Handling During File Operations, Command Line Arguments

GENERIC PROGRAMMING WITH TEMPLATES:

Class Templates with multiple parameters, Function Templates, Overloading of Template Functions, Member Function Templates.

OBJECT-ORIENTED ANALYSIS AND DESIGN:

Object-Oriented analysis and design, procedure oriented development tools, prototyping paradigm

TEXT BOOKS & REFERENCES:

1. Budd,"Object Oriented Programming ", Addison Wesley.
2. Mastering C++ K.R Venugopal Rajkumar, TMH.
3. C++ Primer , "Lip man and Lajole", Addison Wesley. .
4. Maria litvin , Gary litvin,"Programming in C++",Vikas.
5. D Samantha, "Object oriented Programming in C++ and Java ", PHI.
6. The C++ Programming language by Bjarne Stroustrup, Addition-Wesley
7. C++ programming By Robert Leffor
8. An introduction to Object Oriented Programming with C++ by Timthy Budd, Addition-Wesley
9. Kip R. Irvine, C++ and Object-Oriented Programming, Prentice Hall,
10. Object Oriented Programming with C++ by Balaguruswamy, Tata Mcgraw Hill

**NATIONAL INSTITUTE
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TECHNOLOGY
AGARTALA**

COMPUTER SCIENCE AND ENGINEERING DEPARTMENT

SYLLABUS FOR THIRD SEMESTER

SESSIONAL

SESSIONAL WORK FOR 4TH SEMESTER,
COMPUTER SCIENCE & ENGINEERING

MICROPROCESSOR LAB (CSE-405)

CREDITS: 3

L T P
0 0 2

Microprocessor architecture, Microprocessor programming.

Assembly Language of 8085 and 8086 microprocessors. Software controlled serial and parallel I/O in 8085. Use of programmable interrupt controller, programmable peripheral interface (8255). DMA controller, PIT (8253) and DMA.

LINEAR INTEGRATED CIRCUITS LAB(CSE-406)

CREDITS: 3

L T P
0 0 2

At Least 10 experiments to be done using Op- Amp 741, 324, 555, 556, 800 family and 7900 family.

OBJECT ORIENTED PROGRAMMING LAB(CSE-407)

CREDITS: 3

L T P
0 0 3

At least 30 programs based on theoretical topics covered in the class.
