Mahatma Gandhi University
MEGHALAYA
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SYLLABUS MANUAL

INFORMATION TECHNOLOGY
PROGRAMME
**PROGRAMME CODE --- 210205**

**ADVANCE DIPLOMA IN INFORMATION TECHNOLOGY (ADIT)**

**YEAR I**

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**TOTAL** 34

**YEAR II**

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**TOTAL** 32

Advance Diploma in Information Technology (ADIT)

Year I: ITP-11 to ITP14 and ITP-30, ITP-33, ITP-34

Year II: ITP-15 to ITP-21 and ITP-31

If any student wants to appear for semester system then follow the below mentioned subject’s module:

**Semester I**: ITP11-ITP13, ITP33

**Semester II**: ITP14, ITP30 & ITP34

**Semester III**: ITP15-ITP18

**Semester IV**: ITP19-ITP21 & ITP31
Detailed Syllabus

YEAR I

ITP11—INTRODUCTION TO INFORMATION TECHNOLOGY

UNIT I Computing Fundamentals

Brief history of development of computers, Computer system, concepts, Computer system Characteristics, Capabilities and limitations, Types of computers Generations of computers, Personal Computer (PCs) – evolution of PCs, configurations of PCs- Pentium and Newer, PCs Specifications and main characteristics- Basic components of a computer system - Control unit, ALU, Input/output functions and characteristics, memory - RAM, ROM, EPROM, PROM and Other types of memory

UNIT II Input/output Devices and types of Printers

Input/output & Storage Units-: Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors - characteristics and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard - VGA, SVGA, XGA etc, Printers& types - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers

UNIT III Software and its types, Operating System

Software and its Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Introduction to operating system for PCs-DOS Windows, Linux, File Allocation Table (FAT & FAT 32), files & directory structure and its naming rules, booting process details of DOS and Windows,

UNIT IV Languages

DOS system files Programming languages- Machine, Assembly, High Level, 4GL, their merits and demerits

UNIT V Use of communication and IT

Communication Process, Communication types- Simplex, Half Duplex, Full Duplex, Communication Protocols, Communication Channels - Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication; Modem - Working and characteristics, Types of network Connections - Dialup, Leased Lines, ISDN, DSL, RF, Broad band ,Types of Network - LAN, WAN, MAN ,Internet, VPN etc., Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies, Components of LAN - Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways- Internet-Evolution, World Wide Web Internet Services, Convergence of technologies

UNIT VI MIS

Management information system - Introduction, Characteristics, Needs, Different views of MIS, Designing, Placement of MIS, Pitfalls in Designing an MIS, Computer based MIS – Advantages &
Disadvantages

**UNIT VII Computer Applications in Business**
Need and Scope, Computer Applications in Project Management, Computer in Personnel Administration, Information System for Accounting-Cost and Budgetary Control, Marketing and Manufacturing, Computer Applications in Materials Management, Insurance and Stock-broking, Production planning and Control, Purchasing, Banking, Credit and Collection, Warehousing

**UNIT VIII Ms Word**
Introduction to Ms Word, Document Window, Application Window, Formatting in Ms Word, Mail Merge

**Reference Books:**
1. Fundamentals of Technology Project Management by Colleen Garton and Erika McCulloch

**ITP12---Programming In C**

**Block 1: Introducing the Fundamentals of C Programming**
Introduction, Exploring Data Types- The char Data Type, The int Data Type, The float Data Type, The double Data Type, The void Data Type. Introducing Constants, Introducing Variables- Declaring Variables, Initializing Variables. Introducing const and volatile Type Qualifiers- The const Type Qualifier, The volatile Type Qualifier. Explaining Data Type Modifiers, Exploring Backslash Constants, Exploring Symbolic Constant, Exploring Delimiters, Understanding Multiple Assignments.

**Block 2: Managing Input and Output**

**Block 3: Working with Operators and Expressions in C**

**Block 4: Control Structures-I**
Introduction, Exploring the Syntax of a Control Structure, Working with Conditional Statements- Using the if Statement, Using the if-else Statement, Creating the Nested if Statements, Using the if-else Ladder, Using the switch Statement, Creating Nested switch Statements. Working with Iterative Statements- Using the while Loop, Using the do-while Loop, Using the Loop. Working with Jump Statements- Using the break Statement, Using the continue Statement, Using the go to Statement.

Block 5: Arrays

Introduction, Introducing Arrays, Types of Arrays- One-Dimensional Arrays, Two-Dimensional Arrays, and Limitations of Arrays.

Block 6: Working with Functions

Introduction, Overview of Functions- Function Definition, Function Invocation, Types of Functions- Built-in Functions, User-defined Functions, Parameter Passing Mechanisms, Passing Arrays in Function, Recursive Functions, Functions and Variables- Local and Global Variables, Static and Register Variables.

Block 7: String Handling in C-I

Introduction, Understanding Strings in C, Declaring and Initializing a String, Reading and Displaying the Strings- Using the scanf () and printf () Functions, Using the puts() and gets() Functions, Using the getchar() and putchar() Functions. Creating an Array of Strings.

Block 8: String Handling in C-II

Performing String Operations- Concatenating Strings, Calculating the Length of a String, and Comparing Strings- Using String Handling Functions- strlen(), strcmp(), strncmp(), strcat(), strcpy(), strchr(), strlwr(), strupr(), strrev().

Block 9: Structures and Unions


Block 10: Pointers

Introduction, Understanding Pointers, Declaring a Pointer Variable, Using the address of (&) Operator, Initializing a Pointer Variable, Dereferencing a Pointer, Performing Operations on Pointers- Assignment, Arithmetic, Comparison, Working with Functions and Pointers- Call By Value, Call by Reference. Working with Arrays and Pointers- Pointers to One-dimensional Arrays, Pointers to String. Allocating Memory at Runtime- malloc(), calloc(), free(), realloc().

Block 11: Working with Preprocessor Directives


Block 12: Data File Processing in C
Introduction, Exploring Data Files, Opening and Closing Files- Reading from Files, Writing to Files, Accessing Data Files Randomly- The fseek() Function, The ftell() Function, The fread() Function, The fwrite() Function.

ITP13---RDBMS

Block 1: Understanding Database Management System


Block 2: Introducing Relational Database Management System

Introduction. Relational Database Management System- Characteristics of RDBMS, Exploring Tables in Databases, ER Diagrams. Explaining Data Integrity- Entity Integrity, Domain Integrity, Referential Integrity, User-Defined Integrity. Exploring Keys- Primary Key, Foreign Key, Composite key, Candidate Key. Rules of Normalization- First Normal Form, Second Normal Form, Third Normal Form, Fourth Normal Form, Fifth Normal Form. Boyce-Codd’s 12 Rules

Block 3: Performing Basic SQL Operations


Block 4: Performing Transact-SQL Operations

Introduction. Data Types- Exact Numerics, Approximate Numerics, Date and Time, Character Strings, nicode Character Strings, Binary Strings, Other Data Types. Control Flow Statements- The BEGIN...END Statement, The GOTO Statement, The IF...ELSE Statement, The WHILE Statement. Database Operations- Creating a Database, Dropping the Database. Table Operations- Creating a Table, Altering the Table, Truncating the Table, Dropping the Table. Constraints- The PRIMARY KEY Constraint, The UNIQUE Constraint, The FOREIGN KEY Constraint, The CHECK Constraint. Joins- Performing a Cross Join, Performing an Inner Join, Performing an Outer Join, Performing a Self-Join.

Block 5: Working with Stored Procedures and User-Defined Functions


Block 6: Using Triggers


Block 7: Understanding Transaction, Locking, and Error Handling

ITP14—operating system

Block 1: Overview of Operating Systems

Computer and System Software, Objectives and History of Operating Systems, Categories of OS, Job Scheduling, Virtual Storage.

Block 2: Memory Management


Block 3: Process Management and CPU Scheduling


Block 4: Concurrency and Process Synchronization

Need for Concurrent Process Synchronization, Cooperating Processes, The Bounded Buffer Producers and Consumers Problem, Critical Section Problem, Inter-Process Communication, Semaphores, Monitors.

Block 5: Threads

Overview of Threads, User and Kernel Threads, Multithreading Models, Thread Libraries, Design Issues in Threads, Other Threading Issues

Block 6: Deadlock and Starvation


Block 7: Deadlock Handling

Deadlock Prevention, Mutual Exclusion Condition, Hold and Wait Condition, No Preemption, Circular Wait, Deadlock Avoidance, Dijkstra’s Banker’s Algorithm, Deadlock Detection and Recovery.

Block 8: Main Memory and Virtual Memory Management
Block 9: File System Management and Implementation


Block 10: Allocation Methods

File Allocation Methods, Free space management techniques, File System Recovery.

Block 11: Distributed System

Overview of Distributed Systems, Distributed Computing System Models, Design Issues of the DOS.

Block 12: Topologies


Block 13: Security


Block 14: Authentication

User Authentication, Biometrics, Program Threats, Cryptography, Denial of Service Attacks.

Block 15: Introducing Linux

Introducing Linux, Exploring Linux Distributions, Exploring Fedora Linux, Exploring the Features of Fedora Linux, Deploying Fedora Linux

ITP30---Computer Organization and Architecture

UNIT I: Introduction
Computer System, Components of a Computer System, Computer Organization, Data Representation, Performance Factors

UNIT II: Digital Logic Circuits
Digital Computers, Logic Gates, Boolean algebra

UNIT III: Map Simplification
Product-of-Sums Simplification, Don’t Care Conditions.

UNIT IV: Circuits and Flip Flops
Combinational and Sequential Circuits, intro to Flip Flops, Types of Flip Flops

UNIT V: Digital Components
Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters.

**UNIT VI: Data Representation**
Number System, Octal and Hex Decimal Numbers, Decimal Representation, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes

**UNIT VII: Register Transfer and Micro operations**
Register Transfer Language, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations and Shift Micro operations

**UNIT VIII: Programming the Basic Computer**

**UNIT IX: Central Processing UNIT**
Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Program Control, and Program Interrupt.

**UNIT X: Control UNIT**
Introduction, Control Memory, Microprogramming, Computer Configuration, Design of Control UNIT, Overview of RISC/CISC

**UNIT XI: Pipeline and Vector Processing**
Parallel Processing, pipelining, Arithmetic Pipeline, Instruction Pipeline.

**UNIT XII: Memory Organization**
Memory Hierarchy, Main Memory or Primary Memory, Design of Main Memory, Auxiliary Memory, Virtual Memory, Memory Management, Associative Memory

**Reference Books:**
2. The Essentials of Computer Organization And Architecture by Linda Null and Julia Lobur
3. Essentials of Computer Organization and Architecture by Linda Null and Julia Lobur

**ITP33---Practical-ITP12**
**ITP34---Presentation/Seminar**

**YEAR II**

**ITP15---WEB TECHNOLOGY**

**Unit 1: Exploring Web Technologies**

**Unit 2: Exploring HTML**

**Unit 3: Descriptive Markups**

The META Element, Semantic Tags, the Dublin Core and RDF

**Unit 4: Working with Style Sheets**

Internal Style Sheet, Inline Style Sheet, External Style Sheet.

**Unit 5: Client Side Programming**


**Unit 6: Server Side Programming**

Introduction to Server-Side Web Technologies, Programming Languages for Server-Side Scripting, Configuring Server to Support CGI Applications, Working with Forms and I/O Operations

**Unit 7: Miscellaneous Web Technologies**

Exploring Java Technologies, Describing VRML Idea, Microsoft .NET Technology

**ITP16---UNIX with Shell Programming**

**Block 1: Introducing UNIX Operating System**

Introduction, Hardware configuration for Unix, Features of Unix, Architecture of Unix, Unix Commands, PATH, man, echo, Printf, script, passwd, who, date, sty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, Unix Utilities, System calls.

**Block 2: Exploring File System in UNIX**


**Block 3: File System Commands**

File System Commands.

**Block 4: Unlink**

Du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin, Compressing and Decompressing files.

**Block 5: Using advanced Commands in UNIX**
Introduction, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm., cmp, diff, tr, awk, cpio.

**Block 6: Using Vi Editor**

Introduction, Modes, Command Mode, Insert Mode, Basic Navigation, Adding, Deleting and Changing text in vi editor, Saving and reading Files in vi editor.

**Block 7: UNIX Shell Programming**

Introduction, The Shell’s Interpretive cycle, Describing types of Shells in Unix, C Shell, TC shell, Korn Shell, Bash Shell, Redirection, Pipes, Tee command, Shell Variables, Job Control.

**Block 8: Quoting**

Quoting, Quoting with Backlashes, Using Single Quotes, Using Double Quotes.

**Block 9: Substitution**

Substitution, File Substitution, Variable Substitution, Command Substitution, Arithmetic Substitution

**Block 10: Exploring Filters**

Introduction, Filter command, Concatenating File, Display Beginning and End of Files, Paginating File, Cut a File, Pasting Files, Sorting a File.

**Block 11: Translating Characters**

Translating Characters, Searching Duplicate Lines, Counting Characters, Comparing Files, Deleting Lines.

**Block 12: Filtering with Awk**

Introduction, Variables and Expressions, The comparison operators, Variables, Storing awk programs in a file.

**Block 13: Arrays**

Arrays, Functions, String Functions, Mathematical Functions, User-Defined Functions, Splitting Lines into Fields, Comparing sed and awk, Using grep.

**Block 14: Programming in C shell**

Introduction, Environment variables, Adding Environment variables, Setting Environment variables

**Block 15: Using Scripts**

Startup and Shutdown scripts, Command Execution scripts

**Block 16: Expressions**

Using Expressions, Commands Execution in Shell syntax

**ITP17---COMMUNICATION SKILLS**
UNIT I: Concord & Forms of Verbs Rule of Concord or Agreement.

UNIT II: Forms of Verbs: Present Tense, Past Tense, Future Tense, Tenses with Since.

UNIT III: The Future Tense in Adverbial Clauses, Tense in Sentences of Condition.

UNIT IV: Idiomatic use of Prepositions and Conjunctions.

UNIT V: What is an Idiom, Idiomatic Use of Prepositions.

UNIT VI: Words Followed by prepositions.

UNIT VII: Structural Use of Infinitive, Gerund and Participles.

UNIT VIII: The Participle, the Infinitive, Gerunds.

UNIT IX: Common Errors in English Adjectives and Adverbs (Confused).


UNIT XI: Vocabulary Building in English Language Useful Words for Expressing Ideas. Derivations: Root Words.

UNIT XII: Prefixes and Suffixes, Antonyms and Synonyms, Nationality Words: Names of Countries and People.

Reference Books:-

ITP18---Basic mathematics

Block 1: Introduction to Sets

Objectives, Introduction, Types of Sets, Subsets, Equal Sets, Null Sets, Universal Sets, Finite and Infinite Sets, Open and Closed Sets Operations on Sets, Union of Sets, Intersection of Sets, Complement of Set, Partition of Sets, Cartesian Product of Sets, Cardinality of Sets, Venn-Diagrams, Applications of Sets.

Block 2: Relations and Functions

Functions, One-to-One Functions, Composite Functions, Inverse Functions, Algebraic Functions, Trigonometrical Functions, Logarithmic Functions, Exponential Function, Hyperbolic Functions, Zeroes of Functions.

**Block 3: Introduction to Progressions**

Objectives, Introduction, Arithmetic Progression, nth Term of an Arithmetic Progression, Sum of n Terms of an Arithmetic Progression, Arithmetic Mean, Applications of Arithmetic Progression, Geometric Progression, nth Term of a Geometric Progression Sum of n Terms of a Geometric Progression, Geometric Mean, Applications of Geometric Progression.

**Block 4: Harmonic Progression**

Harmonic Mean, Relation between Arithmetic Mean, Geometric Mean and Harmonic Mean.

**Block 5: Determinants**

Objectives, Introduction, Minors and Cofactors, Properties of Determinants, Rank of a Matrix, Inverse of a Matrix, CRAMER’S RULE

**Block 6: Matrices**

Types of Matrices, Operations on Matrices, Addition of Matrices, Subtraction of Matrices, Vector and Scalar Multiplication of Matrices, Inverse of a Matrix, Eigen Vectors of a Matrix, Caley-Hamilton Theorem.

**Block 7: Differential Calculus**


**Block 8: Differential Calculus Series**

Taylor’s Series, Maclaurin’s Series, Indeterminate Form, Leibnitz Theorem, Curve Tracing.

**Block 9: Integral Calculus**

Objectives, Introduction, Integral as Limit of Sum, Fundamental Theorem of Integral Calculus, Indefinite Integrals, Method of Integration, Substitution Method of Integration, By Parts Method of Integration, Partial Fraction Method of Integration, Integration of Algebraic and Transcendental Function, Gamma and Beta Function.

**Block 10: Multiple Integration**


**Block 11: Functions of Several Variables**

Objective, Introduction, Limits and Continuity, Partial Differentiation, Chain Rule, Euler’s Theorem, Maxima and Minima, Lagrange’s Method of Undetermined Multipliers, Taylor’s Formula.
Block 12: Plane Curves and Polar Coordinates


Block 13: Correlation and Regression

Correlation, Types of Correlation, Karl Pearson’s Coefficient of Correlation, Rank Correlation Method, Spearman’s Rank Correlation Coefficient, Regression, Regression Lines, Application of Regression Lines for Forecasting Sales, Coefficient of Regression

Block 14: Probability and Probability Distribution


Block 15: Logarithms and Progression

Introduction, Logarithms, Laws Of Operations, Compound Interest, Arithmetic Progression, Geometric progression, Annuities.

Block 16: Statistics in Business


ITP19---PRINCIPLES OF MANAGEMENT


UNIT IV: Principles of an Organisation, Formal and Informal Organisation, Span of Control, Departmentation—Meaning, Types of Departmentation, Key Factors in Departmentation, Types of


UNIT V: Types of Authority Introduction, Sources of Authority, Decentralisation of Authority, Distinction Between Delegation and Decentralisation, Factors Determining the Extent of Decentralisation, Advantages of Decentralisation, Limitations of Decentralisation, The Technique of Decentralisation, Organisation Charts.


UNIT IX: Staffing ,Staffing Defined ,Job Analysis ,Manpower Planning ,Recruitment ,Transfers and Promotions ,Appraisals ,Manpower Development ,Job Rotation ,Training ,Rewards and Recognition.


Reference Books: -

1. **Total Quality Management in Education** by Sallis Edward (Associate Principal Brunel College of Technology Bristol) and Edward Sallis (Paperback - May 1, 2002)
2. **What Every Principal Should Know About Operational Leadership** (v. 6) by Jeffrey Glanz (Paperback - Nov 28, 2005)
Block 1: Introducing Unix Operating System

Introduction, Hardware configuration for Unix, Features of Unix, Architecture of Unix, Unix Commands, PATH, man, echo, Printf, script, passwd, who, date, sty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, Unix Utilities, System calls.

Block 2: Exploring File System in UNIX


Block 3: File System Commands

File System Commands.

Block 4: Unlink

Du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin, Compressing and Decompressing files.

Block 5: Using advanced Commands in Unix

Introduction, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm., cmp, diff, tr, awk, cpio.

Block 6: Using Vi Editor

Introduction, Modes, Command Mode, Insert Mode, Basic Navigation, Adding, Deleting and Changing text in vi editor, Saving and reading Files in vi editor.

Block 7: UNIX Shell Programming

Introduction, The Shell’s Interpretive cycle, Describing types of Shells in Unix, C Shell, TC shell, Korn Shell, Bash Shell, Redirection, Pipes, Tee command, Shell Variables, Job Control.

Block 8: Quoting

Quoting, Quoting with Backslashes, Using Single Quotes, and Using Double Quotes.

Block 9: Substitution

Substitution, File Substitution, Variable Substitution, Command Substitution, Arithmetic Substitution

Block 10: Exploring Filters

Introduction, Filter command, Concatenating File, Display Beginning and End of Files, Paginating File, Cut a File, Pasting Files, Sorting a File.

Block 11: Translating Characters
Block 12: Filtering with Awk

Introduction, Variables and Expressions, The comparison operators, Variables, Storing awk programs in a file.

Block 13: Arrays

Arrays, Functions, String Functions, Mathematical Functions, User-Defined Functions, Splitting Lines into Fields, Comparing sed and awk, Using grep.

Block 14: Programming in C shell

Introduction, Environment variables, Adding Environment variables, Setting Environment variables

Block 15: Using Scripts

Startup and Shutdown scripts, Command Execution scripts

Block 16: Expressions

Using Expressions, Commands Execution in Shell syntax

ITP21---Enterprise Resource Planning

Block 1: Introduction of Management Information System

Block 2: Management Information System (MIS)
Nature and Scope of MIS, Characteristics of MIS, Functions of MIS, Structure of MIS, Physical Components, Information Processing, Management Activities at Various Levels, Decision Support System

Block 3: Strategic Role of MISH
Objectives, Introduction, Strategic MIS, Competitive Advantages with MIS, Customer Relationship Management (CRM), Supply Chain Management (SCM), Enterprise Resource Planning (ERP), Business Process Re-Engineering (BPR), Total Quality Management (TQM)

Block 4: Management of Data Resources
Objectives, Introduction, Concept of Data, Types of Data, Methods of Data Collection, Data Warehousing, Data Mining

Block 5: Designing Database
Hierarchical Data Model, Network Data Model, Relational Data Model, Resource Requirement and Procurement
Block 6: Decision Support Systems


Block 7: Types of Decision Support Systems

Types of Decision Support Systems, Tools and Technologies used in DSS, DSS and Outsourcing.

Block 8: Introduction to ERP


Block 9: Implementation of ERP

Advantages and Disadvantages of ERP, Comparison between EMS and MIS.

Block 10: ERP and E-Commerce


Block 11: ERP and Applications of E-Commerce

ERP and Challenges of E-Commerce.

Block 12: ERP and Related Technologies

Introduction, ERP Related Technologies, Online Analytical Processing, Data Mining.

Block 13: Business Intelligence

Integration of ERP and Related Technologies.

Block 14: Emerging Trends in ERP

Introduction, Emerging Technologies, ERP Deployment Models, Future of ERP.

Block 15: Ethical Aspects and Security of Information

Introduction, Ethics in Information Technology, Ethical Challenges of IT.

Block 16: Security of Information


ITP31—DIGITAL ELECTRONICS FUNDAMENTALS

Unit I
Number System and Codes: Introduction, Number System (Binary Numbers, decimal-binary conversion, Octal Numbers, Octal-Binary Conversions, Hexadecimal Numbers, Hexadecimal-Binary conversions, Hexadecimal-octal conversions), Floating Point Representations of Numbers, Arithmetic Operations (Binary Arithmetic), 1’s and 2’s Compliment (1’s Compliment Subtraction, 2’s Compliment Subtraction, Signed Binary number Representations, Addition in the 2’s compliment System, Subtraction in the 2’s compliment system.

Boolean Algebra: Basic Laws of Boolean algebra (Boolean addition, Boolean Multiplication, Properties of Boolean Algebra, Demorgan theorems, Sum of Products and Product of Sums, (Minterm, Maxterm, Deriving Sum of Products(SOP) Expression from Truth Table, Deriving Product of Sum(POS) Expression from Truth Table, Karnaugh Map (Two variable, Three variable).

Unit II

Logic gates: Logic gates (OR Gate, AND Gate, NOT Gate, NAND Gate, NOR Gate, Ex- OR Gate, Ex-NOR Gate).

Arithmetic Circuits: Half Adder, Full Adder, Half-Subtractor, Full Subtractor, Combinational Circuits: Multiplexers, Basic four input multiplexer, Demultiplexers, 1 to 4 demultiplexer, Decoders, Basic Binary decoder, 3 to 8 decoder, Encoders: Decimal to Binary Encoder.

Unit III

Flip Flops: Introduction, Flip Flops, Types of Flip-Flops, S-R Flip-Flop (NOR Based, NAND Based), Clocked S-R Flip-Flop, D Flip-Flop, J-K Flip-Flop

Memories: Introduction, Classification of memories, Registers, Main Memories and Secondary Memory, Sequential Access Memory And Random Access Memory, Static and Dynamic Memory, Volatile and Non Volatile Memory, Magnetic and Semiconductor Memory, Basic Memory Structure.