

**Swami Ramanand Teerth Marathwada University  
Dyanteerth, Nanded**

**Teaching and Examination Scheme for Second Year Computer Science & Engineering (w.e.f. academic year 2009-10)**

**Semester - III**

- 01 Mathematics III
- 02 Digital Systems and Microprocessor
- 03 Discrete Mathematics
- 04 Data Structures
- 05 Data Communication

**Semester - IV**

- 01 Mathematics IV
- 02 Computer Algorithms
- 03 Principles of Programming Languages
- 04 System Programming
- 05 Advanced Microprocessors
- 06 Communication Skills

**Swami Ramanand Teerth Marathwada University, Nanded  
Second Year U.G. Structure  
(Department: Computer Science & Engineering)  
(Semester III)**

**1.ENGINEERING MATHEMATICS III**

**UNIT - I Linear Differential equations of Higher order – I 8 Hrs**

- 1.1 Introduction to L.D.E. with constant coefficients
- 1.2 General solution of  $f(D)y = X$ , shortcut methods
- 1.3 Non-Homogeneous linear equations: i) Solution by Method of variation of parameters  
ii) Solution by Method of undetermined coefficients
- 1.4 Equations Reducible to L.D.E. with constant coefficients i.e.
  - i) Cauchy's Homogeneous linear equation
  - ii) Legendre' Linear equations

**UNIT – II Linear Differential equations of Higher order - II 6 Hrs**

- 2.1 Simultaneous L.D.E. with constant coefficient
- 2.2 Symmetrical simultaneous equations

$$\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$$

... by i) Method of Grouping ii) Method of Multipliers.

- 2.3 Applications of L.D.E. to electrical circuits.

**UNIT – III Vector Differential Calculus 7 Hrs**

- 3.1 Vector and Scalar functions, fields, derivatives
- 3.2 Gradient of Scalar field, Directional derivative and Geometrical meaning of gradient (Gradd .)
- 3.3 Divergence and curl of a vector fields
- 3.4 Solenoidal and Irrotational vectors
- 3.5 Second order diff operator and vector identifies

**UNIT – IV Vector Integral Calculus 7 Hrs**

- 4.1 Line integral, Line integral independent of path, Line Integral in parametric form
- 4.2 Circulation of a vector [Work done]
- 4.3 Green's Theorem [without proof] its verification and applications
- 4.4 Surface Integral, Stoke's Theorem [without proof] and its applications
- 4.5 Gauss Divergence Theorem [without proof] and its applications to Engineering Problems

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

### **UNIT – V Statistics 6 Hrs**

- 5.1 Correlation: Scatter diagram, Types of correlations
- 5.2 Karl Pearson's coefficient of correlation
- 5.3 Regression: Lines of regressions, Lines of regression of Bivariate data
- 5.4 Curve fitting: Fitting of curves by Least Square Method

### **UNIT – VI Probability 6 Hrs**

- 6.1 Introduction, Random variable
- 6.2 Discrete and continuous Probability Distributions
- 6.3 Binomial Distribution
- 6.4 Poisson Distribution
- 6.5 Normal Distribution

### **Text Books**

1. Advanced Engineering Mathematics by Erwin Kreyszig (8th Edition, Wiley Eastern Ltd.) ISBN-9971-51-283-1
2. Advanced Engineering Mathematics by B. S. Grewal (40th Edition, Oct 2007, Khanna Publication Delhi) ISBN-81-7409-195-5.
3. Advanced Engineering Mathematics by R. K. Jain and S. R. K. Iyengar (Third Edition, Narosa Publication) ISBN-978-81-7319-730-7.

### **Reference Books:**

1. Applied Mathematics (Volume-I ISBN- 81-85825-10-6 & Volume-II ISBN-81-85825-07-06 ) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)
2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill) ISBN-0-07-063419-X.
3. Engineering Mathematics by Thomas and Finney.

## **2.DIGITAL SYSTEMS & MICROPROCESSOR**

### **UNIT 1 Introduction and Logical Functions Representation (7 Hrs)**

Analog, Discrete-time and Digital Signals, Difference between Analog and Digital System, Universal Gates, Signed Number Representation, Binary Codes, Boolean algebra & its minimization – SOP and POS Form, Don't care combinations, KMap (up to 5 variables), and Quine McCluskey method.

### **UNIT 2 Combinational Logic Designs (7 Hrs)**

Half/Full Adder/Subtractor, Carry Look Ahead Adder, Carry Save Adder, 4-bit Parallel Add/ sub, BCD Adder / Subtractor , Array Multiplier, Booths Multiplier, Decoders-Encoders, Multiplexers-Demultiplexers, Parity Checker, Comparator, and Barrel Shifter.

### **UNIT 3 Sequential Logic Designs (6 Hrs)**

Review of Latches and Flip-Flops, Master Slave JK and D Flip-Flops, Conversion of Flip-Flops, Counters: 4 bit Ripple and Synchronous, Universal Shift Register, Finite State Machine, State Diagram, Moore & Mealy Machines, Semiconductor Memories – Memory Organization, RAM & its types, ROM & its types.

### **UNIT 4 8085 Architecture and Pin Diagram (6 Hrs)**

Definition of Microprocessor, Microprocessor based system, Evolution of Microprocessors, Properties of 8085, Detailed Architecture of 8085, Pin Diagram of 8085, and Interrupt Circuitry of 8085, De-multiplexing of address and data bus, 8085 clock & reset circuit, Addressing Modes of IC8085.

### **UNIT 5 8085 Instruction Set and Programming (8 Hrs)**

Instruction set of 8085, 8085 programming model, Assembly language Programming – Simple, loop, Conditional, Subroutines etc., Memory mapped I/O, I/O mapped I/O, Exhaustive and Partial decoding, Memory Interfacing with 8085.

### **UNIT 6 Data Converters (5 Hrs)**

Programmable Peripheral Interface IC8255, Introduction to ADC and DAC and their types, ADC IC0808/09 and DAC IC0808/09, Interfacing IC8255 to 8085, Interfacing ADC IC0808/09 and DAC IC0808/09 to 8085.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

### Text Books

1. A. Anand Kumar, "Fundamentals of Digital Circuits", Prentice Hall of India.
2. John F. Wakerly, "Digital Design: principles and practices", Third Edition, Pearson Education.
3. R. P. Jain, "Modern Digital Electronics", Third Edition Tata McGraw-Hill.
4. Ramesh S. Gaonkar "The Microprocessor: Architecture, Interfacing, Programming and Design.", Wiley Eastern.
5. B. Ram, "Fundamentals of Microprocessors and Microcomputers", Dhanpat Rai & Sons.

### Reference Books

1. Charles Roth, "Fundamentals of Logic Design", Cengage Learning India Pvt. Ltd.
2. Douglas Hall "Digital Systems and Microprocessors", , Pearson Education Asia.
3. William I. Fletcher "Engineering Approach to Digital Design", , PHI.
4. Samuel C. Lee "Digital circuits and Logic design", , Prentice Hall.
5. John P. Hayes "Computer Architecture and Organization", , McGraw Hill International Editions (Computer Science Series).
6. U.V.Kulkarni and T.R.Sontakke "The 8085 Basics, Programming and Applications", , Sadhusudha Prakashan.
7. , R. Singh, B. P. Singh "Microprocessors, interfacing and Applications, New Age International

## 3.DISCRETE MATHEMATICS

### UNIT-1 (10 Hrs)

#### Logic & Proofs

Introduction, statements and Notation, Connectives - negation, conjunction, disjunction, Conditional, biconditional, statement formulas and truth tables, well formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal & Principle normal forms. Predicates and Quantifiers, Methods of Proofs, Mathematical Induction.

### UNIT-2 (10 Hrs)

#### Sets, Relations & Functions

**Basic concepts of set theory** Set, Types of operations on sets, Ordered pairs, Cartesian product, Principle of inclusion and exclusion.

**Relations, Functions** Representation of discrete structures, Relations, Properties of binary relations, Partition and Covering of set, Equivalence relation, Composition, Closure of Relation, Warshall's algorithm, POSET and, Functions - Types, Composition of functions, Inverse functions, Recurrence relations, Linear recurrence relations, Solution to recurrence relations, Generating functions. (Growth of Functions: Big- $O$  notation)

### UNIT-3 Graphs (5 Hrs)

Basic terminology, multi graphs and weighted graphs, paths and circuits, shortest path Problems, Euler and Hamiltonian paths and circuits, factors of a graph.

### UNIT-4 Trees (5 Hrs)

Trees, rooted trees, path length in rooted trees, binary search trees, spanning trees and cut set, theorems on spanning trees, cut sets, circuits, minimal spanning trees.

### UNIT-5 Lattices (6 Hrs)

Lattice as POSET, definition, examples and Properties, Lattice as algebraic systems, Special lattices, Boolean algebra definition and examples, Boolean functions, representation and minimization of Boolean functions .

### UNIT-6 Algebraic Systems (4 Hrs)

Semi groups and monoides, properties and examples. Algebraic Systems, Groups, Semi Groups, Monoid, Subgroups, Codes and Group codes, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups.

### Text Books

- 1."Discrete Mathematical Structures", B. Kolman, R. Busby and S. Ross, Pearson Education, 4th Edition, 2002, ISBN 81-7808-556-9.
2. "Discrete Mathematics and Its Applications", Kenneth H. Rosen, Tata McGraw-Hill, 5th Edition, 2003, ISBN 0-07-053047-5
3. "Discrete Mathematical structures with applications to computer science", J. P. Tremblay and R. Manohar, MGH International.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

### Reference Books

- 1."Elements of Discrete Mathematics", C. L. Liu, Tata McGraw-Hill, 2nd Edition, 2002,ISBN 0-07-043476-X
- 2."Theory and Problems in Abstract algebra", Schaums outline series, MGH International.
3. "Discrete Mathematics ", Lipschutz, Lipson., Tata McGraw-Hill, 2nd Edition, 1999,ISBN 0-07-463710--X

## 4.DATA STRUCTURES

### UNIT I (7 Hrs)

- . Review of 'C': Arrays, pointers, Functions (call by values and call by reference), Recursion, and Files (open, close and edit files in C).
- . Introduction to data structures: Information and Meaning, Primitive data structures and Non primitive data structures, Arrays, Structures, Pointers, Abstract Data Types (ADT), Realization of ADT in 'C'.

### UNIT II (7 Hrs)

- . Linear Data structures
- . The Stack: Operations (PUSH and POP), Representation in C.
- . Applications of stacks: Infix, Prefix and Postfix expressions and their Conversions, Recursion.
- . Queues: Operations (insertion and deletion), Representations, Priority queues.

### UNIT III (7 Hrs)

- . Linked Lists: Singly Linked list and its operations, Circular lists and its operation, Doubly linked list and its operations.
- . Applications of linked lists: Arithmetic of long integers, Dictionary, Polynomial representations and its arithmetic, Implementation of stack and queue using linked organization.

### UNIT IV (7 Hrs)

- . Non linear Data structures: Trees, Binary trees, Binary tree representations (sequential and linked ), Tree traversals ( Preorder, Postorder and Inorder)
- . Applications of Binary Trees: Evaluating expressions tree, Binary search tree, and Game tree.

### UNIT V (6 Hrs)

- . Graphs: Definition, Types of Graphs, Representations of graph: Adjacency List, Adjacency matrix representations
- . Traversal of graph: Breath First Search, Depth First Search.

### UNIT VI (6 Hrs)

- . Indexing and Searching: Basic Indexing and search techniques, Hashing, Tree Indexing, Construction of hash tables and Construction of binary search trees

### Text books

1. "Data Structures using C and C++", Y. Langsam, M.J. Augenstein, A.M. Tenenbaum, Second Edition ,PHI India. ISBN- 81-203-1177-4
2. "Fundamentals of Data Structures in C" , E. Horowitz ,S.Sahani, S.Anderson- Freed Universities Press ,2008
3. "An Introduction to Data Structures with applications",J.P.Trembly and P.G.Sorenson, Second Edition, Tata McGraw Hill, 1981

### Reference Books

1. " Data Structures" , Richard F. Gilberg, B.A. Forouzen, Thomson's Books/cole publishing.ISBN -981-240-622-0
2. "Data Structures and Algorithms", A. Aho, J. Hopcroft, J. Ulman, Pearson Education, 1998

## 5.DATA COMMUNICATION

### UNIT I (7Hrs)

- . Introduction: Data communication, Networks, internets
- . Network models: layered tasks, The OSI model and layers, TCP/IP protocol suit, Addressing
- . Data and Signals: Analog and Digital, Periodic and analog, digital signals, transmission impairment, data rate limits, Performances.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

### **UNIT II (6 Hrs)**

- . Digital Transmission: Digital to analog and Analog to Digital conversions, Transmission modes.
- . Bandwidth Utilization: Multiplexing, Spread Spectrum

### **UNIT III (6 Hrs)**

- . Transmission media: Guided media, unguided media
- . Switching: Circuit Switching Network, Data gram network, virtual- circuit network, and structure of a switch.

### **UNIT IV (6 Hrs)**

- . Data Transmission: Telephone network, Dial-up modems, Digital subscriber line, cable TV network and Data transfer.
- . Error Detection and Correction: Block coding, linear block code, cyclic code, and checksum.

### **UNIT V (8 Hrs)**

- . Data link control: Framing, flow and error control, protocols, noisy and noiseless channels, HDLC, Point-to-point protocol.
- . Multiple Access: Random access, Controlled access, channelization.
- . Wired LAN (Ethernet): IEEE standards, Standard Ethernet, changes in the standard, fast Ethernet, Gigabit Ethernet.

### **UNIT VI (7 Hrs)**

- . Wireless LANs: IEEE 802.11, Blue tooth.
- . Connecting LANs: Connecting Devices, backbone network, Virtual LAN.

### **Text Book**

1. "Data Communications and Networking", Behrouz A. Forouzan, 4th Edition, Tata McGraw Hill, 2006. ISBN 13: 978-0-07-063414-5

### **Reference Books**

1. "Data and computer Communication", William Stallng, 7th Edition, Pearson Education, 2004, ISBN 81-297-0206-1.
2. "Data Communications and Networks", Godbole A., Tata McGraw-Hill Publications
3. "Communication Networks - Fundamental Concepts and Key Architectures", Garcia L., Widjaja I., 2nd edition, Tata McGraw-Hill, 2000,
4. "Data Communications", Gupta P., PHI, 2004

**Swami Ramanand Teerth Marathwada University, Nanded**  
**Second Year U.G. Structure**  
**(Department: Computer Science & Engineering)**  
**(Semester IV)**

### **1.ENGINEERING MATHEMATICS IV**

#### **UNIT - I Laplace Transforms and Applications 10 Hrs**

- 1.1 Definition, Existence of L.T.
- 1.2 Properties: Linearity, Change of scale, First shifting, Second shifting, Multiplication by t, Division by t., L.T. of derivative and Integral
- 1.3 Inverse L.T., Methods of obtaining inverse L.T., Convolution Theorem
- 1.4 L.T. of special functions
  - i) Unit (Heaviside) step function
  - ii) Unit Impulse function (Dirac delta function)
  - iii) Periodic functions
- 1.5 Applications of L.T. to initial value problems, simultaneous differential equations

#### **UNIT – II Fourier Series and Fourier Transforms 8 Hrs**

- 2.1 Fourier series: Definition, Dirichlet's conditions, Euler's formulae
- 2.2 Fourier series over (0, 2... Functions having points of discontinuity

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

- 2.3 Change of interval
- 2.4 Expansions of Even and Odd functions, Half range series
- 2.5 Fourier Integrals: Definition complex form of Fourier integral
- 2.6 Fourier Sine and Cosine Integral
- 2.7 Fourier Transforms, Fourier Sine and Cosine Transforms

**UNIT – III Z Transforms 4 Hrs**

- 3.1 Definition: Standard properties, ZT of standard sequences
- 3.2 Inverse Z Transform
- 3.3 Applications of Z Transform to simple difference equations

**UNIT – IV Complex Analysis – I 6 Hrs**

- 4.1 Introduction of complex variable, limit, continuity and derivative
- 4.2 Analytic function, C-R equation in cartesian and polar form
- 4.3 Harmonic functions, Orthogonal System
- 4.4 Construction of analytic function  $f(z) = u + iv$  if  $u$  or  $v$  or  $u \pm v$  are given

**UNIT – V Complex Analysis – II 8 Hrs**

- 5.1 Complex Integration: Line Integral of complex plane
- 5.2 Cauchy's Integral Theorem for simply and multiply connected regions
- 5.3 Cauchy's Integrated formula
- 5.4 Series of Complex terms: Convergence, Behavior radius of convergence of series
- 5.5 Taylor's and Laurent's series [without proof]
- 5.6 Singularities, Residues, Residues Theorem, Evaluation of real definite integrals
- 5.7 Conformal mappings: Translation, Magnification rotation and Bilinear Transformation

**UNIT – VI Numerical Analysis 4 Hrs**

- 6.1 System of Linear simultaneous equations: 1) Direct Methods of solution- Gauss Elimination method, Gauss Jordan Method.
- 6.2 2) Iterative Methods of solution: Gauss Seidal Iteration Method.

**Text Books**

- 1. Advanced Engineering Mathematics by Erwin Kreyszig (8th Edition, Wiley Eastern Ltd.) ISBN-9971-51-283-1
- 2. Advanced Engineering Mathematics by B. S. Grewal (40th Edition, Oct 2007, Khanna Publication Delhi) ISBN-81-7409-195-5.
- 3. Advance Engineering Mathematics by R. K. Jain and S. R. K. Iyengar (Third Edition, Narosa Publication) ISBN-978-81-7319-730-7.

**Reference Books:**

- 1. Applied Mathematics (Volume-I ISBN- 81-85825-10-6 & Volume-II ISBN-81-85825-07-06 ) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)
- 2. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill) ISBN-0-07-063419-X.
- 3. Engineering Mathematics by Thomas and Finney.

**2.COMPUTER ALGORITHMS**

**UNIT I (7 Hrs)**

- . **Role of algorithms in Computing:** Algorithms , Algorithms as a technology
- . Getting started: Insertion sort, Analyzing algorithms, Designing algorithms.
- . Growth of Functions: Asymptotic Notations:  $o$  ,  $\theta$  ,  $\Omega$  Complexities (Time and space).

**UNIT II (7Hrs)**

- . **Recurrences:** The substitution method , Tthe recurrence tree method and master's method.
- . Sorting algorithms: Heaps, Maintaining a heap property, Building a heap, Heap sort, Priority queues and Quick sort.

**UNIT III (6 Hrs)**

- . **Dynamic Programming** – Assembly line scheduling, Matrix chain multiplication, elements of dynamic programming, Longest common subsequences and optimal binary search trees.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)

#### UNIT IV (8 Hrs)

- . **Greedy method** – An activity selection problem, Elements of greedy strategy, Huffman codes.
- . Data structures for disjoint sets: Disjoint set operations, Linked list representation of disjoint sets, and Disjoint forest.

#### UNIT V (8Hrs)

- . **Graph algorithms:** Minimum cost spanning trees, Single source shortest paths, All pair shortest paths.

#### UNIT VI (6Hrs)

- . **NP-Hard and NP-complete problems** - Basic concepts, Reducibility, Cook's theorem (without proof), NP-Hard graph problems.

#### Text Books

1. "Introduction to Algorithms", T.H. Cormen, C.E. Leiserson, R.L. Rivest, The MIT press, Cambridge, Massachusetts and McGraw Hill, 1990 ISBN-81-203-2141-03
2. "Fundamentals of Computer Algorithms", E. Horowitz and S. Sahni, S Rajasekaran, Third Edition, Golgotha Publications.

#### Reference books

1. "The Design and Analysis of Computer Algorithms", A.V. Aho, J.E. Hopcroft and J.D. Ullman, Addison Wesley,
2. "Fundamentals of Algorithms", G. Brassard and P. Bratley, PHI India, 1996 ISBN-81-203-1131-0

### 3. PRINCIPLES OF PROGRAMMING

#### UNIT I (4 Hrs)

Introduction, Abstractions in Programming Languages, Computational paradigms, Language Definition, Language Translation, History, Language design principals.

#### UNIT II (7 Hrs)

Syntax, Lexical Structure of Programming Languages, Context-Free Grammars and BNFs, Parse Trees and Abstract Syntax Trees, Ambiguity, Associativity and precedence, EBNFs and Syntax Diagrams, Parsing Techniques and Tools, Lexics Versus Syntax Versus Semantics, Basic Semantics, Attributes, Binding and Semantic Functions, Declarations, Blocks and Scope, The Symbol Table, Name Resolution and Overloading, Allocation, Lifetimes and the Environment, Variables and Constants, Aliases, Dangling References and Garbage.

#### UNIT III (6 Hrs)

Data Types and Type Information, Simple Types, Type Constructors, Type Nomenclature in Sample Languages, Type Equivalence, Type Checking, Type Conversion, Polymorphic Type Checking, Explicit Polymorphism, Expressions, Conditional Statements and Guards, Loops and Variation on WHILE, The GOTO Controversy, Exception Handling.

#### UNIT IV (9 Hrs)

Procedures and Environments, Procedure Definition and Activation, Procedure Semantics, Parameter Passing Mechanisms, Procedure Environments, Activations and Allocation, Dynamic Memory Management, Exception Handling and Environments, Abstract Data Types and Modules, The Algebraic Specification of Abstract Data Types, Abstract Data Type Mechanisms and Modules, Separate Compilation, C++ Namespaces, and Java Packages, Ada Packages, Modules in ML, Modules in Earlier Languages, Problems with Abstract Data Type Mechanisms, The Mathematics of Abstract Data Types.

#### UNIT V (9 Hrs)

Object-Oriented Programming, Software Reuse and Independence, Java: Objects, Classes and Methods, Inheritance, Dynamic Binding, C++, Smalltalk, Design Issues in Object-Oriented Languages, Implementation Issues in Object-Oriented Languages, Functional Programming, Programs as Functions, Functional Programming in an Imperative Language, Scheme: A Dialect of LISP, ML: Functional Programming with Static Typing, Delayed Evaluation, Haskell, A Fully-Curried Lazy Language with Overloading, The Mathematics of Functional Programming I: Recursive Functions, The Mathematics of Functional Programming II: Lambda Calculus.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)



## UNIT VI (5 Hrs)

Logic Programming, Logic and Logic Programs, Horn Clauses, Resolution and Unification, The Language Prolog, Problems with Logic Programming, Extending Logic Programming: Constraint Logic Programming and Equational Systems.

### Text Book

1. "Programming Language Principles and Practices", Kenneth C. Louden, Second Edition, Thomson 2003.
2. "Concepts of Programming Languages", Robert W. Sebesta, Eighth Edition, Addison Wesley, 2007. ISBN 978-00321-49362-0.

### Reference Books

1. "Programming Languages: Concepts and Constructs", 2nd Edition, Ravi Sethi, Pearson Education Asia, ISBN 81 – 7808 – 104 – 0.
2. "The C Programming Language", B. W. Kernighan, D. H. Ritchie, Second Edition, Prentice-Hall, Edition, 1988
3. "The C++ Programming Language", B. Stroustrup, Third Edition, Addison-Wesley, 1997

## 4.SYSTEM PROGRAMMING

### UNIT I (5 Hrs)

#### Introduction

System Software and Machine architecture, Simplified Instructional Computer, Traditional CISC Machines-VAX architecture, Pentium Pro architecture, RISC Machines-Ultra SPARC architecture, PowerPC architecture, Cray T3E architecture, Instruction formats-Addressing modes.

### UNIT II (8 Hrs)

#### Assemblers

Elements of Assembly Language Programming, Basic Assembler Functions, Machine Dependent Assembler Features, Machine Independent Assembler Features, Assembler Design Options-One Pass Design options-One Pass Assemblers, Multi Pass Assemblers, Implementation Examples- MASM Assembler.

### UNIT III (8 Hrs)

#### Loaders and Linkers

Basic Loader Functions – Design of an Absolute Loader, A Simple Bootstrap Loader, Machine Dependent Loader Features –Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader, Machine Independent Loader Features – Automatic Library Search, Loader Options, Loader Design Options – Linkage Editors, Dynamic Linking, Bootstrap Loaders, Implementation Examples – MS DOS Linker, SunOS Linkers.

### UNIT IV (8 Hrs)

#### Macro Processors

Basic Macro Processor Functions – Macro Definition and Expansion, Macro Processor Algorithm and Data Structures, Machine Independent Macro Processor Features – Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters, Macro Processor Design Options- Recursive Macro Expansion, General Purpose Macro Processor, Macro Processing within Language Translators, Implementation Examples- MASM Macro Processor.

### UNIT V (7 Hrs)

#### Compilers and Utilities

Basic Compiler Functions, Different phases of a compiler, Machine Dependent Compiler Features, Machine Independent Compiler Features, Simple one pass compiler, Implementation Examples- SunOS C Compiler.

### Unit VI: (4 Hrs)

Software Tools for program development, Steps in Program Development, Editors and its Types, Design of an Editor, Debug Monitors, Programming Environments, User Interfaces – Command Dialogs, Structure of User Interface.

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)



### **Text Books**

1. Leland L.Beck, "System Software, An Introduction to System Programming ", Addison Wesley, 1999.

### **Reference Books**

1. D.M.Dhamdhere, " Systems Programming and Operating Systems ", Tata McGraw Hill Company, 1999.

2. J.J. Donovan " System Programming" Mc-Graw Hill.

3. A.V.Aho, Ravi Sethi and J.D.Ullman, " Compilers Principles, Techniques and Tools ", Addison Wesley, 1988

## **5.ADVANCED MICROPROCESSORS**

### **UNIT 1 8086/88 Architecture and Instruction Set (8 Hrs)**

8086 architecture, Addressing modes, Instruction formats, Data transfer, String, Logical, Arithmetic, Branch, Loop, and Processor control instructions, Logical to Physical address translation, Comparison of 8086 with 8088. (8) Hrs

### **UNIT 2 8086 Operating Modes, Interrupts and Programming (7 Hrs)**

Basic 8086 configurations: Maximum and Minimum mode, Support chips 8282, 8284, 8286, 8288, 8086 stack structure, 8086 interrupts, Assembly Language Programming using DEBUG/MASM.

### **UNIT 3 Memory Interfacing, RISC/CISC and 8051 (8 Hrs)**

Memory interfacing with 8086, Even & Odd Memory banks, Features of RISC/CISC Architecture, RISC vs. CISC, difference between microprocessor & microcontroller, 8051 Architecture, I/O configuration, Interrupts, Port structure and operation, Timer/ counter functions, Memory organization, Addressing mode and Overview of instruction set of 8051.

### **UNIT 4 Intel x86 Families (5 Hrs)**

80x86 Family i.e.80286, 80386, 80486, Real mode and Protected mode, software model of 80x86 family, Registers, Data Organization, Instruction types, Addressing Modes and Interrupts, Interrupt Vector Table, Interrupt Processing Sequence, Special interrupts, comparison of 80x86 microprocessors.

### **UNIT 5 Peripherals Interfacing and Advance Programming (9 Hrs)**

Programmable Interval Timer IC8253, Programmable Interrupt Controller IC8259, Keyboard and Display controller IC8279, IC8086 interfacing with IC8253, IC8259, and IC8279, Using EXTRN and PUBLIC, Macros, Multitasking, Memory Management, Memory Resident program.

### **UNIT 6 Pentium and Higher End Processors (8 Hrs)**

Pentium's Superscalar Architecture, Pipelining, Branch Prediction, Instruction and Data Caches, Floating Point Unit, Segmentation, Paging, Multitasking, Exceptions and interrupts, Virtual and Protected mode, Intel's Dual Core, Core 2 duo and EPIC Technology: architecture, advantages, future scope.

### **Text Books**

1. Liu & Gibson "Microcomputer system – The 8086/8088 family", , PHI.

2. Ray and Bhurchandi "Advanced Microprocessors and Peripherals", , TMH.

3. James L. Antanakos, "An Introduction to the Intel Family of Microprocessors", Pearson Education Asia.

4. "Microprocessors, Interfacing & Assembly language programming", Douglas Hall, TMH.

5. Kenneth J. Ayala, Delmar Learning "The 8051 Microcontroller: architecture, programming and applications", Second edition.

### **Reference Books**

1. Walter A. Triebel, Avtar Singh "16-Bit and 32-Bit Microprocessors: Architecture, Software, and Interfacing Techniques", , Paperback edition.

2. Tabak Daniel "Advanced Microprocessor", , TMH.

3. A.P. Mathur, Third Edition "Introduction Microprocessor, TMH.

4. Muhammad ali Mazidi and Janice Gillispie Mazidi, "The 8051 Microcontroller and Embedded System Pearson Education.

## **6.COMMUNICATION SKILLS**

### **UNIT I Basics of Communication (3 Hrs)**

Definition; Elements of Communication; Cycle of Communication and Feedback. Types of Communication: Verbal and Nonverbal (Oral, Written, Graphic Language and Body Language) Upward and

Downward, Formal and Informal, Media of communication: verbal non-verbal and audio-visual, Principles of Effective Communication, Barriers of Communication.

**UNIT II Listening Skills (3 Hrs)**

Active Listening: Basic Principles Listening and Note Making, listening to Conversations from IELTS

**UNIT III Reading Skills (2 Hrs)**

Active Reading, Types, Skimming, Browsing, etc. Reading and Note Making, Comprehension

**UNIT IV Speaking Skills (4 Hrs)**

Basics of Presentation, Techniques, Group Discussions. Interview techniques, Public Speaking and Seminars, Pronunciation Basics.

**UNIT V Writing Skills (4 Hrs)**

Business Correspondence, Business Letters, Job Application, Resume, Paragraph (Technical, Business or General current issues) Reports.

**UNIT VI English Grammar and Vocabulary (4 Hrs)**

Tenses, Common Errors in English, Synonyms, Antonyms, One Word Substitution.

Ravangaonkar Chandrashekhhar

[Shekhar4u86@gmail.com](mailto:Shekhar4u86@gmail.com)