

Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana**Department of Computer Science****Teaching Plan Session-2022-23****Msc .-Ist Semester-Ist****1S : Digital Systems and Microprocessor**

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|----------------------------|--------------|
| 1 | July | UNIT-I : | Representation of integers and floating point nos., Boolean Algebra: laws, simplification of logic equations using Boolean laws, SOP and POS, standard forms of SOP and POS, Karnaugh Maps don't care conditions in K-map | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Design of Arithmetic circuits: Half Adder, half subtractor, full adder, full subtractor, parallel binary adder, subtraction using 1's and 2's compliment schemes, use of adder as subtractor, controlled parallel adder, ALU IC 74181. | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Design of Arithmetic circuits: Half Adder, half subtractor, full adder, full subtractor, parallel binary adder, subtraction using 1's and 2's compliment schemes, use of adder as subtractor, controlled parallel adder, ALU IC 74181 | 04 03 03 02 03 | 15 |
| 4 | sep | UNIT-IV : | Flip Flops: construction and working of RS, JK, MS-JK, D and T Flip flops. Shift registers and Counters: Buffer register, controlled buffer register, shift registers: SISO, SIPO, PISO, | 04 04 03 04 | 15 |

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| | | | PIPO, bidirectional shift register, ring counter, twisted ring counter, applications of shift registers; Counters: asynchronous counter designs, synchronous counter, UP/DOWN counters, lock out in counters | | |
| 5 | oct | UNIT-V : | Overview of microcomputer system, evolution of microprocessors, architecture of 8086 microprocessor, pin diagram, signal description, register organisation, concept of pipelining, memory segmentation, memory address generation, modes of operation of 8086 (minimum and maximum). | 04 03 03 02 03 | 15 |
| 6 | nov | UNIT- VI : | . Stack structure, interrupts in 8086 microprocessor, interrupt responses, Interrupt Vector Table, H/W and S/W interrupt processing; Interfacing: absolute and linear decoding, I/O mapped I/O and Memory Mapped I/O, memory interfacing (Even and Odd Banks), interfacing of keyboards, interfacing of displays, interfacing if ADC and DAC, address mapping. | 04 04 03 04 | 15 |
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Amrut Sevabhavi Sanstha's Parbhani
Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana
Department of Computer Science
Teaching Plan Session-2022-23
Msc .-Ist Semester-Ist

1S : Net Technologies and C#

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | July | UNIT-I : | Understanding .net: The C# environment: origins of .net technology, .net framework, the common language runtime, framework base classes, user and program interfaces, visual studio .net, .net languages, benefits, c# and .net | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Overview of C#: namespaces, comments, aliases for namespaces, command-line arguments, program structure; Literals, variables and data types, operators, expressions, Decision making and branching, looping, methods in c#, Array handling, string manipulation, structures and enumerations | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Classes and objects: Principle of OOP, Access modifiers, constructors, destructors, Nesting of classes; Inheritance and Polymorphism: multilevel inheritance, hierarchical inheritance, overriding, hiding methods, abstract methods and classes, sealed classes and methods; Interfaces: defining, extending and implementing interfaces, interfaces and inheritance, explicit interface implementation, abstract class and interfaces. | 04 03 03 02 03 | 15 |
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| 4 | Sep oct | UNIT-IV : | Operator overloading: unary, binary, comparison, Delegates and events; Console I/O operations: console class, console inputoutput, formatted output. Errors and Exceptions: types of errors, exceptions, exception handling codes, multiple catch statements, exception hierarchy, catch handler, finally statement, nested try blocks. | 04 04 03 04 | 15 |
| 5 | oct | UNIT-V : | Multithreading in c#: Introduction, System. Threading namespace, scheduling, synchronizing threads, thread pooling. File Manipulation: Managing File System, Moving, copying, deleting files, Reading, writing to files, Reading Drive information, File Security | 04 03 03 02 03 | 15 |
| 6 | nov | UNIT- VI : | . Data Access with .Net: ADO.net overview, Database connections, commands, the Data Reader, the DataSet class, populating a DataSet, persisting a DataSet. | 04 04 03 04 | 15 |
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1S : Operating System

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | July | UNIT-I : | Services, Types, User-O.S. Interface: Command Interpreter, Graphical User Interface; System Calls; System Programs; Operating System Structure: Simple, Layered Approach; Micro-kernels, Modules; Virtual Machine; System | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Process Management: Process Concept, Process States, Process Control Block, Process Scheduling: Schedulers, Context Switch; Operations on Process: Creation, Termination, Inter Process Communication; Threads: Concept, Benefits; CPU Scheduling: Burst Cycle, Types of Scheduling, Scheduler, Dispatcher, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority Scheduling, Round-Robin, [multiple processor | 04 04 03 04 | 15 |
| 3 | aug | UNIT-III : | Process Synchronization and Deadlocks: Critical Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors. Deadlock: System Model, Deadlock Characterization, Resource Allocation Graph, Methods for handling Deadlock: Prevention, Avoidance and Detection; Recovery from Deadlock: Process Termination | 04 03 03 02 03 | 15 |
| 4 | sep | UNIT-IV : | Memory Management: [Basic Hardware, Address Binding]; | 04 | 15 |

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| | | | Logical and Physical Address Space, Swapping, Contiguous Allocation, Dynamic Storage Allocation: First-fit, Best-Fit, Worst-fit; Fragmentation; Paging; Segmentation. Virtual Memory: Introduction, Virtual Address Space, Demand Paging, Copy-on-write, Page Replacement: Concept, Page Replacement Algorithms: FIFO, Optimal Page Replacement, LRU, Second-Chance Page Replacement; Thrashing, I/O Interlock. | 04 03 04 | |
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| 5 | oct | UNIT-V : | File System: File: Concept, Attributes, Operations; File Organization and Access: Sequential, Index Sequential, Indexed, Direct or Hash File. Directory: Operations, Structures. Protection: Access Control and Permissions. File System Structure, Allocation Methods, Free Space Management. Disk Structure, Disk Scheduling Algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK. [Disk Management, Swap Space Management], RAID: Concept. I/O Systems: I/O Hardware, Interrupts, DMA, Application I/O Interface, Kernel I/O | 04 03 03 02 03 | 15 |
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| 6 | nov | UNIT- VI : | .. : Distributed File System: Concept, Naming and Transparency, Remote File Access, Stateful Vs Stateless Service, File Replication, Remote Login, Remote File Transfer, Data Migration, Computation Migration, Process Migration. Embedded Operating Systems: Embedded Systems: Definition, Requirements and Constraints, Organization of Embedded System; Characteristics of Embedded Operating Systems. | 04 04 03 04 | 15 |
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Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana**Department of Computer Science****Teaching Plan Session-2022-23****Msc .-Ist Semester-Ist****1S : Computer Networks**

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | July | UNIT-I : | Digital Communication: Advantages; Data Transmission: Modes: Parallel, Serial: Asynchronous, Synchronous, Isochronous; Transmission Media: Guided and unguided; Modulation: Amplitude, Phase Shift, Frequency, QAM; Multiplexing: FDM, WDM, TDM, STDM, CDM; Switching: Circuit, Message, Packet; Delays in Packet Switched Network, Packet Loss; Network Reference Models: OSI: Layered Architecture and Services, TCP/IP: Layered Architecture and Services | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Application Layer: Principles of Application Layer Protocols; Processes: Client-Server Model, Socket Interface; Services required by Application Layer; HTTP: Introduction, RTT, HTTP Handshake, types of HTTP Connections, HTTP Messages, Authentication and Cookies; FTP: Service Model, FTP Commands; Electronic Mail; SMTP; DNS: Services and | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Transport Layer: Transport-Layer Services and Principles; Multiplexing and Demultiplexing Applications; Connectionless Transport – UDP; Principles of Reliable of Data Transfer (RDT); Stop-and-wait and Pipelined protocols; GBN protocol; Connection-Oriented Transport: TCP; Flow Control; Principles of Congestion Control; Approaches | 04 03 03 02 03 | 15 |

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| | | | towards Congestion Control; TCP Congestion Control | | |
| 4 | Sep oct | UNIT-IV : | Network Layer: Introduction; Network Service Model: Datagram, Virtual Circuit; Routing Principles; Routing Algorithms: Classifications; Hierarchical Routing; Internet Protocol: IP Addressing, IPv4: Classes and Packet format, DHCP; ICMP; Routing in the Internet: RIP, OSPF, BGP; Router; IPv6; Multicast Routing | 04 04 03 04 | 15 |
| 5 | oct | UNIT-V : | Data Link Layer: Introduction; Services; Error Detection and Correction; Multiple Access Protocols and LANs; LAN Addresses and ARP; Ethernet; Hubs, Bridges and Switches; Wireless LANs: IEEE 802.11; The Point-to-Point Protocol; ATM, X.25 and Frame Relay | 04 03 03 02 03 | 15 |
| 6 | nov | UNIT- VI : | . Network Security and Management: Secured Communication: Threats and Characteristics; Cryptography: Principles of Cryptography, Symmetric Key Cryptography, Public Key Cryptography; Privacy, Authentication, Integrity, Nonrepudiation; Digital Signature; Key Distribution and Certification. Areas of Network Management; Network Management Architecture; Internet Network Management Framework; SMI, MIB, SNMP. | 04 04 03 04 | 15 |
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Department of Computer Science

Teaching Plan Session-2022-23

Msc .-Ist Semester-2st

2S : Java Programming

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|----------------------------|--------------|
| 1 | Dec jan | UNIT-I : | Introduction to java, Java development tools, Java and WWW, Java applications, java building elements: Identifiers, Keywords, variables, constants, operators. Data types and type casting and type conversion. Control Structures: Simple if, If..else, switch statement, Loop structure : For , Do..while, while , loop control using break and continue | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Objects and classes: class variable, instance variable, class methods, Access specifier, access modifiers. Methods: main method, creating methods, calling methods, overloading methods, abstraction, recursion. Object: Initialization of object using constructors, parameterized constructor, Dynamic Memory allocation, Garbage collection. Passing objects to methods. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Packages: creating and importing packages, Arrays : Declaration, initialization, sorting searching, array of objects. String: String class, StringBuffer, StringTokenizer. Command line arguments. Inheritance: super class, subclass , super keyword, this keyword, final modifier, abstract class, Method overriding. Interface: implementing interfaces. | 04 03 03 02 03 | 15 |
| 4 | mar | UNIT-IV : | Applet: Life cycle of an applet, APPLET tag, passing arguments to an applet, paint, repaint, update methods. | 04 04 | 15 |

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| | | | Graphics class, AWT class hierarchy, Frames, Layout managers, components, containers. Color class, Font class | 03 04 | |
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| 5 | april | UNIT-V : | Exception Handling : Error and Exception class, Error handling routine, try , catch , throw, throws, finally, uncaught exceptions, built-in exception, nested try-catch, user defined exception. Thread: Thread class, Runnable interface, states, priority and synchronization. Java I/O classes, File handling. | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | . : User Interface: Button, Label, TextField, TeatArea, Choice, List, CheckBox, CheckBox Group, Dialog Boxes, Menu Multiple Windows, Event handling: Event Delegation model, Adapter classes, Event classes, Event Listener Interfaces, Handling Mouse and Keyboard events. | 04 04 03 04 | 15 |
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2S : Data Structures

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|----------------|--------------------|---------------------|--|--|---------------------|
| 1 | Dec jan | UNIT-I : | Introduction, Types of Data Structures, Linear & Nonlinear data structures, Arrays: Arrays as ADT, 1D, 2D, Multidimensional Arrays, Memory Representation and Applications. Linked List : Concept , Operations : Insert, Delete, Traversal, Static implementation using arrays, Dynamic implementation , Doubly Linked list, Circular list, Linked list applications : Merging of two linked lists. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Stacks: Introduction, Push and Pop operations, Stack implementation using array, Stack applications, Infix to Postfix conversion of expression, Expression evaluation, Recursion. Queues: Introduction, Insert and Delete operations, Queue implementation using array, Types – Priority Queue, Circular queue, Dequeue, Queue applications: CPU Scheduling Algorithms FCFS , Round Robin algorithm, Stacks and Queues as Linked Lists | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Trees: Terminology and Concepts , Binary Tree Representation, Static implementation using arrays , Linked representation, Binary Search Tree, Operations on Binary search tree - Insert, Delete, Tree Traversals, Representing, Threaded binary trees, Height-balanced trees, AVL Rotations. Searching: Sequential binary tree searches. Unit IV : Searching and Sorti | 04 03 03 02 03 | 15 |

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| 4 | mar | UNIT-IV : | Searching and Sorting :Searching, Concept and need, Techniques, Linear search, Binary search, Indexed sequential search, Sorting, Concept and Need, Performance criteria, Bubble sort, Insertion Sort, Selection Sort, Shell Sort, Quick Sort, Heap Sort, Merge Sor | 04 04 03 04 | 15 |
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| 5 | april | UNIT-V : | Graphs :Terminology and concepts, Graph Representation: Adjacency matrix, Adjacency list, Adjacency multi-list, Traversals: Depth first and Breadth first. Minimum spanning tree, shortest path algorithm, topological ordering, sparse matrices, linked list implementation of graph and graph traversal. | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | Indexing: B-tree indexing, Multilevel indexing, B+ tree, Hashing, Collision processing, Bucket hashing, Dynamic hashing, Linear hashing, Extendible hashing, Tries. | 04 04 03 04 | 15 |
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Department of Computer Science

Teaching Plan Session-2022-23

Msc .-Ist Semester-2st

2S : Software Engineering

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|----------------------------|--------------|
| 1 | Dec Jan | UNIT-I : | . System Concept: Definition, Characteristics of System, Elements of System; Types of System: Physical or Abstract Systems, Open or Closed Systems, Man-made Information Systems; Subsystem. System Analyst: Role; Skills: Interpersonal, Technical; Information Gathering Tools (Fact Finding Techniques); Feasibility Study. Introduction to Software Engineering: Definition and Characteristics of Software; Software Application Domains; Software Engineering: Definition, Layered Model. | 04 03 03 02 03 | 15 |
| 2 | Jan Feb | UNIT-II : | Software Process Framework; Umbrella Activities. Process Models: SDLC (Waterfall); Incremental; Evolutionary Models: RAD, Prototyping, Spiral; Concurrent Development Model; Components based Development Model. Agility: Agile Process: Assumptions, Agility Principles, Human Factors. Software Engineering Practice: Essence of Practice, Core Principles, Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Requirements Engineering: Requirements Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification, Validation. Requirements Management; Steps in Requirements Engineering. Requirements Analysis: | 04 03 03 02 | 15 |

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| | | | Objectives; Requirements Modeling Approaches: Scenario-Based Modeling: Use-Case; Class Models: E-R Diagram, Class Diagrams; Flow Oriented Modeling: DFD, CFD; Behavioral Models: State Diagram, Sequence Diagrams | 03 | |
| 4 | mar | UNIT-IV : | Software Design: Design Process and Quality; Design Concepts: Abstraction, Architecture, Modularity, Information Hiding, Functional Independence, Refinement. Component Level Design: Component-Definition; Object-oriented View, Traditional View, Cohesion, Coupling. Designing Traditional Components: Graphical Design – Notations (Flow Chart), Tabular Design – Notations (Decision Table), Program Design Language (Structured English or Pseudo-code). User Interface Design: Rules; Interface Design Models; Interface Analysis. | 04 04 03 04 | 15 |
| 5 | april | UNIT-V : | Software Quality: Definition; Garvin’s Quality Dimensions; McCall’s Quality Factors; ISO 9126 Quality Factors. Software Quality Assurance: Elements, Goals, ISO 9001-2000 Quality Standards. Software Metrics: Attributes, Metrics for Requirements Model: Function-based Model (FP). Metrics for Specification Quality, Metrics for Design Model: Architectural Design Metrics. Metrics for Object-Oriented Design, UserInterface Design Metrics, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance. | 04 03 03 02 03 | 15 |
| 6 | may | UNIT- VI : | Software Testing: Need, Verification and Validation, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging, Test Characteristics. White Box Testing: Flow Graph Notations, Test Cases, Control Structure Testing. Black Box Testing: Graph-based Testing Methods, | 04 04 03 04 | 15 |

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| | | | Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing. | | |
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2S : Discrete Mathematical Structures

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | Dec jan | UNIT-I : | . Mathematical logic: Introduction, statements and notations, connectives – negation, conjunction, disjunction, Statement formulas and truth tables, conditional, bi-conditional, well formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal and principal normal forms, completely parenthesized infix and polish notations, Theory of inference for statement calculus – validity using truth table, rules of inference, consistency of premises and indirect method of proof. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Set theory: Basic concepts of set theory, representation of discrete structures, relations and ordering: relations, properties of binary relations in a set, relation matrix and graph of a relation, partition and covering of a set, equivalence relation, compatibility relations, composition of binary relations, Functions – composition of functions, Inverse function. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Algebraic Structures: Algebraic systems: Examples and general properties, Semigroups and monoids, Grammar and Languages, Polish expressions and their compilation, Groups- Definition and examples, subgroups and | 04 03 03 02 | 15 |

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| | | | homomorphism, cosets and Lagrange's theorem, Group codes – the communication model and basic notions, generation of codes by using parity checks, error recovery in group codes | 03 | |
| 4 | mar | UNIT-IV : | Lattices and Boolean algebra: Lattice as POSETs, definition, examples and properties, Lattice as algebraic systems, sublattices, Direct product and homomorphism, Special lattices, Boolean algebra - definition and examples, subalgebra, Direct product and homomorphism, Boolean functions, representation and minimization of Boolean Finite state machines | 04 04 03 04 | 15 |
| 5 | april | UNIT-V : | Graph theory: Basic concepts of graph theory – definitions, paths, reachability and connectedness, matrix representation, Storage representation and manipulation of graphs- trees, representation and operations, list structures and graphs, Simple precedence grammars-syntax terminology, a view of parsing, notion and use of precedence relations, formal definiti | 04 03 03 02 03 | 15 |
| 6 | may | UNIT- VI : | Fault detection in combinational switching circuits – Faults in combinational circuits, Notions of Fault detection, Algorithm for generating a fault matrix, procedure for detection of faults; Introduction to computability theory: Finitestate acceptors and regular grammars, Turing machines and | 04 04 03 04 | 15 |
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Department of Computer Science
Teaching Plan Session-2022-23
Msc .-Ist Semester-2st

2S : : Compiler Construction

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | Dec jan | UNIT-I : | . Introduction to Compilers: Overview, typical compiler Structure, implementation. Programming Language Grammars: Elements of formal language grammars, derivation, reduction, syntax tree, ambiguity, regular grammars and expressions. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Scanning and Parsing Techniques: The scanner, top-down and bottom-up parsing, syntax directed translation, Symbol table organization, Hash table organization, Linked List and Tree structured symbol tables, symbol table organization for structures and records. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Memory Allocation: Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, common and equivalence allocation. Compilation of expressions. | 04 03 03 02 03 | 15 |
| 5 | mar | UNIT-V : | Error detection, indication and recovery. Compilation of I/O statements: Compilation of I/O list, compilation of FORMAT list, the I/O routine, file control. | 04 03 03 | 15 |

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| 6 | April may | UNIT- VI : | Code optimization: Major issues, optimizing transformations, local optimizations, program flow analysis, Global optimization, writing compilers. | 04 04 03 04 | 15 |
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Department of Computer Science
Teaching Plan Session-2022-23
Msc .-2nd Semester-3st

3S : Data Mining and Data Warehousing

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---|------------|--------------|--|------------------|--------------|
| 1 | Dec jan | UNIT-I : | Introduction, Data Mining Functionalities, Data | 04 | 15 |
| | | | Preprocessing: Data Cleaning, Data Integration and | 03 | |
| | | | Transformation, Data Reduction, Data Discretization and | 03 | |
| | | | Concept Hierarchy Generation. | 02 | |
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| 2 | Jan feb | UNIT-II : | Data Warehouse and OLAP Technology: Overview, A | 04 | 15 |
| | | | Multidimensional Data Model, Data Warehouse | 04 | |
| | | | Architecture, Data Warehouse Implementation, From Data | 03 | |
| | | | Warehousing to Data Mining. Data Cube Computation and | 04 | |
| | | | Data Generalization: Efficient Methods for Data Cube | | |
| Computation, Data Generalization and Concept Description. | | | | | |
| 3 | Feb mar | UNIT-III : | Mining Frequent Patterns, Associations, and Correlations: | 04 | 15 |
| | | | Basic Concepts, Efficient and Scalable Frequent Itemset | 03 | |
| | | | Mining Methods, Mining Various Kinds of Association Rules, | 03 | |
| | | | From Association Mining to Correlation Analysis, Constraint- | 02 | |
| | | | Based Association Mining. | 03 | |
| 4 | mar | UNIT-IV : | Classification and Prediction: Issues, Classification by | 04 | 15 |
| | | | Decision Tree Induction, Bayesian Classification, Rule-Based | 04 | |
| | | | Classification, Classification by Backpropagation. Prediction: | 03 | |
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| | | | Linear Regression, Nonlinear Regression, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor. | | |
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| 5 | april | UNIT-V : | Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data. Mining Time-Series Data, Mining Sequence Patterns in Biological Data | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | : Graph Mining, Social Network Analysis and Multirelational Data Mining. Mining Object, Spatial, Multimedia, Text, and Web Data, Data Mining Applications, Trends in Data Mining | 04 04 03 04 | 15 |
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3S : Computer Graphics

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|----------------------------|--------------|
| 1 | July | UNIT-I : | . Geometry and line generation: Introduction, points and lines, planes and coordinates, Line segments, perpendicular line segments, vectors, pixels and frame buffers, vector generation, character generation, displaying the frame buffer. Graphics primitive: Introduction, display devices, primitive operations, the Display-File Interpreter, normalized device coordinates, Display-file structure, Display control, Text line style primitives. | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . : Polygon: Introduction, Polygon , Polygon representation, Entering polygon, An inside test, filling polygon, Antialiasing. Transformations: Introduction, matrices, scaling transformations, sin and cos, sum of angles, identifiers, rotation, homogeneous coordinates and translation, rotation about an arbitrary point, other transformations, display procedures | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Segments: Introduction, the segment table, segment creation, closing a segment, deleting a segment, renaming a segment, visibility, image transformations, saving and showing segments, other display file structures, some raster techniques, Windowing and clipping: Introduction, viewing transformation, implementation, clipping, clipping the polygon, adding clipping to the system, a voiding division, | 04 03 03 02 03 | 15 |

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| | | | generalized clipping, position relative to an arbitrary line, multiple windowing, | | |
| 4 | Sep oct | UNIT-IV : | Interaction : Introduction, hardware, input devices, handling algorithm, event handling, sample devices, the detectability attributes, simulating a locator with a pick and pick with a locator, Echoing, Interactive techniques. Three dimension: Introduction, 3D Geometry, primitives and transformations, rotation about an arbitrary axis, parallel projection, perspective projection, viewing parameters, conversion to view plane coordinates, The 3D viewing transformation, , special projection. | 04 04 03 04 | 15 |
| 5 | Oct | UNIT-V : | Hidden surfaces and lines: Introduction, back face removal, the painter algorithm, collection of polygons, remembering the style, the hidden surface check, decomposition into triangles, comparing two triangles, The minima test, Overlapping edges, containment of points, finding a point in the triangle plane, comparing of the entire triangle, establishing depth order, geometrical sorting, linked list, sorting the triangles. | 04 03 03 02 03 | 15 |
| 6 | nov | UNIT- VI : | Shading: Introduction, diffusion, illumination, point source illumination, specular reflection, transparency and shadows. Curves: Introduction, curve generation, implementation, interpolating polygons, E-splines, B-Splines and Curves. | 04 04 03 04 | 15 |
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Late Ku. Durga K. Banmeru Science College, Lonar Dist- Buldana
Department of Computer Science

Teaching Plan Session-2022-23

Msc .-2nd Semester-3st

3S : Client-Server Computing

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | July | UNIT-I : | Networking in Java: Basics, Socket overview, Client-Server concepts, Proxy servers, Internet addressing, Java Networking classes and interfaces, InetAddress, TCP/IP Client Sockets, URL Connection, TCP/IP Server sockets, Creating TCP client server | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Java Database Connectivity: JDBC concepts, JDBC API, DriverManager, Connection, Statement and ResultSet classes with relevant methods. Prepared and Callable statements, Handling queries, inserts, deletes and updates to database. Displaying query results | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Servlets: Structure and lifecycle of Servlets, Servlet API: basics, Various classes & interfaces. Servlet requirements, writing. Running and debugging of Servlets, Concepts of Cookies, State and session management with Servlet API. Server side includes and request forwarding. Servlet chaining. Jdbc Servlets. | 04 03 03 02 03 | 15 |
| 4 | Sep | UNIT-IV : | JavaScript Overview, Variables, Operators, Data Types, Control Statements, Functions and Objects, The Window | 04 04 | 15 |

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| | oct | | Object: Dialog Boxes, Status Bar Messages, Window Manipulations; The Document Object: Writing to Documents, Dynamic Documents, The Form Object: Working With Form Elements and Their Properties The String and RegExp Objects, Dates and Math ies The String and RegExp Objects, Dates and Math o | 03 04 | |
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| 5 | Oct | UNIT-V : | Remote Method Invocation (RMI): Object serialization in Java, Concept of remote object, Architecture of RMI application, Java RMI package, classes & Interfaces, Client-Server application using RMI, RMI Servlets, RMI-JDBC Servlets. | 04 03 03 02 03 | 15 |
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| 6 | nov | UNIT- VI : | . Introduction to JSP; Simple JSP concepts, Request-time expressions. Advanced JSPs: Scripts. conditionals, loops, Try/Catch. Concept of Beans, Properties, Bean instances & serialization; Bean Scopes, Writing Beans, Introspection, Beans & Scriplets.. | 04 04 03 04 | 15 |
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3S : Distributed Operating System

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | July | UNIT-I : | Introduction to distributed systems: goals of distributed system, hardware and software concepts, design issues. Communication in distributed systems: Layered protocols, ATM networks, the client-server model, remote procedure call and group communication. | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | . Synchronization in distributed systems: Clock Synchronization, mutual exclusion, Election Algorithms, the Bully algorithm, a ring algorithm, atomic transactions, dead lock in distributed systems, distributed dead lock prevention, and distributed dead ock detection. | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Processes and processors in distributed systems: Threads, system, models, processor allocation, scheduling in distributed system, fault tolerance and real time distributed systems. | 04 03 03 02 03 | 15 |
| 4 | Sep oct | UNIT-IV : | Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems. Distributed shared memory: What is shared | 04 04 03 04 | 15 |

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| | | | memory, consistency models, page based distributed shared memory, shared variable, distributed shared memory, object based DSM. | | |
| 5 | Oct | UNIT-V : | Case Study : AMOEBA : Introduction to AMOEBA, objects and capabilities in AMOEBA, Process Management in AMOEBA, Memory Management in AMOEBA, Communication in AMOEBA. The AMOEBA servers : The Bullet Server - Interface and Implementation, The Directory Server – Interface and Implementation, The Replication Server, The Run Server, The Boot Server, The TCP/IP Server, Other Servers | 04 03 03 02 03 | 15 |
| 6 | nov | UNIT- VI : | Case study MACH: Introduction to MACH, Process management, in MACH, Memory management in MACH, communication in MACH, UNIX emulation in MACH. Case study DCE: Introduction to DCE threads, RPC's, Time service, directory service, security service, distributed file system. | 04 04 03 04 | 15 |
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3S : Theory of Computation

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | July | UNIT-I : | Strings, alphabets and languages, Graphs and trees, Inductive proofs, set notations, relations, Finite automata and regular Expression: Finite state system, Non deterministic finite automata, Finite automata with ϵ -moves. Deterministic finite automata, equivalence between NFA and DFA, Conversion of NFA to DFA | 04 03 03 02 03 | 15 |
| 2 | July - Aug | UNIT-II : | Regular set and regular expression, Two way finite automata, finite automat with output, Applications of finite automata. Equivalence of RE and FA, Inter conversion, pumping lemma, closure property of regular sets, Regular grammars, Right linear and Left linear grammar, equivalence between Regular linear grammar and FA inter conversion between RE and RG | 04 04 03 04 | 15 |
| 3 | Aug sep | UNIT-III : | Context free grammar, derivation trees, Chomsky Normal Form, Greibach Normal Form. Push Down Automata: Definition, model, acceptance of CFL, equivalence of CFL and PDA , Interconversion, Enumeration of properties of CFL. | 04 03 03 02 03 | 15 |
| 4 | Sep oct | UNIT-IV : | Turing Machine: Definition, model, Design of turing machine, computable languages and function, Techniques of | 04 04 03 | 15 |

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| | | | turing machine construction, Modifications of Turing machine, Church's Hypothesis. | 04 | |
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| 5 | Oct | UNIT-V : | , Chomsky Hierarchy of languages, Linear bounded automata and context sensitive languages, Introduction of DCFL and DPDA, Decidability of problems. | 04 03 03 02 03 | 15 |
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| 6 | nov | UNIT- VI : | . I: Undecidability : Properties of recursive & non recursive enumerable languages, universal turing machine, post correspondence problem, introduction to recursive function theory. | 04 04 03 04 | 15 |
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Msc .-2nd Semester-4st

4S : Artificial Intelligence and Expert Systems

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | Dec jan | UNIT-I : | Prolog Programming: Introduction to turbo prolog, introduction to language, structure of language, cut, fail, recursion, lists and complex structures, interactive programming, expert system in prolog. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Introduction: Definition of AI, AI technique, tic-tac-toe, pattern recognition, level of the model, criteria for success, problems and problem spaces, defining the problems, production systems, control strategies, heuristic search, problem characteristics, decomposition of problems, solution steps, predictability, absolute and relative solutions. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Basic problem solving methods, reasoning, problem trees and graphs, knowledge representation, matching indexing with variables, heuristic functions, weak methods, problem reduction, constraints satisfaction, means-ends analysis, analysis of search algorithms. | 04 03 03 02 03 | 15 |
| | mar | | | | |
| 5 | | UNIT-V : | Knowledge representation using predicate logic: | 04 | 15 |

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| | | | representing simple facts in logic, augmenting the representation, structural representation of knowledge: some common knowledge structures, choosing the level of representation, finding the right structure as needed, declarative representation | 03 03 02 03 | |
| | april | | | | |
| 6 | | UNIT- VI : | . Natural Language Understanding: Concept of understanding, keyword matching, syntactic and semantic analysis, understanding, language generation and matching translation. General concepts of implementation of AI systems. Introduction to pattern recognition. Rule based systems, semantics of CFL, semantic network, frames, frame kit. Application, introduction to knowledge engineering, artificial neural network: introduction, learning: single and multilayer networks | 04 04 03 04 | 15 |
| | may | | | | |

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4S : Design and Analysis of Algorithms

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|--|--|--------------|
| 1 | Dec jan | UNIT-I : | Introduction: algorithm, writing algorithms in SPARKS, structured program, analyzing algorithms, Divide and conquer: The general method, Binay Search, Finding minimum and maximum, merge sort, quick sort, selection sort, Strassen's matrix multiplication. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | . Greedy Method: The general method, Optimal storage on tapes, Knapsack problem, Job sequencing with deadlines, Optimal merge patterns, minimum spanning trees, Single source shortest path. Dynamic programming: General method, multistage graph, all pair shortest paths, Optimal binary search trees, 0/1 knapsack , Travelling salesperson problem, flow shop scheduling. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Basic Search and Traversal techniques: General method, code optimization, AND/OR graph, game trees, biconnected components and depth first search , Back tracking : General method, 8-queens problem, sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem. | 04 03 03 02 03 | 15 |
| 4 | mar | UNIT-IV : | Branch and bound: General method, 0/1 knapsack problem, Travelling salesperson, efficiency considerations, Algebraic simplification and transformations: General method, | 04 04 03 04 | 15 |

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| | | | evaluation and interpolation, fast Fourier transform, modular arithmetic | | |
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| 5 | april | UNIT-V : | Lower bound theory: comparison trees for sorting and searching, Oracle and adversary arguments, techniques for algebraic problems, some lower bounds and parallel computation. | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | NP-Hard and NP-Complete problems: basic concept, cook's theorem, NP-Hard graph problem, NP-Hard scheduling problem, NP-Hard code generation problem. | 04 04 03 04 | 15 |
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4S : Network Security

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | Dec jan | UNIT-I : | . Introduction: Terminology, Notation, Networking Security Attacks, Layers And Cryptography, Authorization, Tempest, Keys, Viruses, Worms, Trojan Horses, Multilevel Model of Security, Legal Issues | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | . Cryptography: Introduction, Breaking an Encryption Scheme, Types of Cryptographic Function, Respective Algorithms, Standards and Modes of Operation, Hashes and Message Digests. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Authentication: Overview of Authentication System, Password-based Authentication, Address-based Authentication, Cryptographic Authentication Protocols, Keys, Trusted Intermediaries, Authentication of People, Security Handshake Pitfalls: Login Only, Mutual Authentication, Integrity / Encryption for Data, Mediated Authentication, Performance Considerations. | 04 03 03 02 03 | 15 |
| 4 | mar | UNIT-IV : | Standards: Kerberos V4: Tickets, Kerberos V5: ASN.1, Names, | 04 04 | 15 |

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| | | | Delegation of Rights, Ticket Lifetimes, Key Versions, Optimizations. Cryptographic Algorithms, Kerberos V5 Messages, Real Time Communication Security: IPSec: AH & ESP: Overview of IPSEC, IP and IPV6, AH (Authentication Header), ESP (Encapsulating Security Payload) | 03 04 | |
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| 5 | april | UNIT-V : | E-mail Security: Distribution Lists, Store and Forward, Security Services for E-Mail, Establishing Keys, Privacy, Authentication of Source, Message Integrity, Non Repudiation, Proof of Submission, Proof of Delivery, Message Flow Confidentiality, Anonymity, Containment. PEM and S/MIME, PGP | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | Firewalls: Packet Filters, Application Level Gateways, Encrypted Tunnels, Comparisons. Security Systems: Netware V3, Netware V4, Microsoft Windows Security. Web Issues: URLs/URIs, HTTP, Cookies. Web Security Problems. | 04 04 03 04 | 15 |
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4S : Mobile Communications

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | Dec jan | UNIT-I : | . Mobile Communication: Applications, History, Market, Simplified Reference Model. Frequencies, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular System. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | . Medium Access Control: Need, SDMA, FDMA, TDMA, CDMA, Comparison of S/T/F/CDMA. Telecommunica | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | ., Satellite Systems: History, Applications, Basics, Routing, Localization, Handover, Examples. Broadcast Systems: Overview, Cyclical Repetition of Data, Digital Audio Broadcasting, Digital Video Broadcasting, C | 04 03 03 02 03 | 15 |
| 4 | mar | UNIT-IV : | Wireless LAN: Infrared Versus Radio Transmission, Infrastructure and Adhoc Network, IEEE 802.11, HIPERLAN, Bluetooth. | 04 04 03 04 | 15 |

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| 5 | | UNIT-V : | Layers: Mobile Network Layer: Mobile IP, DHCP, Mobile Adhoc Networks. Mobile Transport Layer: Traditional TCP, Classical TCP improvements, TCP over 2.5/3G Wireless Networks. | 04 03 03 02 03 | 15 |
| | april | | | | |
| 6 | | UNIT- VI : | . Support For Mobility: File Systems, World Wide Web, Wireless Application Protocol, i-Mode, SyncML, WAP2.0. | 04 04 03 04 | 15 |
| | may | | | | |

4S : Digital Image Processing

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | Dec jan | UNIT-I : | . I : Introduction: Definition, Origins, Examples: X-ray Imaging, Ultraviolet Band, Visible and Infrared Bands, Microwave Band, and Radio Band Imaging; Fundamental Steps, Components of an Image Processing System Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, A Simple Image Formation Model; Image Sampling and Quantization; Basic Relationships Between Pixels; Linear and Nonlinear Operations. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | : Image Enhancement in the Spatial Domain: Basic Gray Level Transformations; Histogram Processing - Histogram Equalization, Histogram Matching (Specification), Local Enhancement; Enhancement Using Arithmetic/Logic Operations; Basics of Spatial Filtering, Smoothing Spatial Filters: Smoothing Linear, Smoothing Order-Statistics Filters; Sharpening Spatial Filters : The Laplacian, The Gradient; Combining Spatial Enhancement Methods | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Image Enhancement in the Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain: OneDimensional Fourier Transform and its Inverse, TwoDimensional DFT and Its Inverse, Filtering in the Frequency Domain, Correspondence between Filtering in the | 04 03 03 02 03 | 15 |

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| | | | Spatial and Frequency Domains; Smoothing and Frequency-Domain Filters - Ideal , Butterworth, and Gaussian Lowpass Filters; Sharpening Frequency Domain Filters - Ideal , Butterworth, and Gaussian Highpass Filters, Laplacian in the Frequency Domain, Unsharp Masking, High-Boost Filtering, and High-Frequency Emphasis Filtering; Homomorphic Filtering; Implementation: Additional Properties of the 2-D Fourier Transform, Inverse Fourier Transform Using a Forward Transform Algorithm, Need for Padding, Convolution and Correlation Theorems, The Fast Fourier Transform; | | |
| 4 | mar | UNIT-IV : | Image Restoration: Model of the Image Degradation/ Restoration Process, Noise Models: Restoration in the Presence of Noise Only Spatial Filtering: Mean, Order-Statistics, and Adaptive Filters; Periodic Noise Reduction by Frequency Domain Filtering: Bandreject, Bandpass, and Notch Filtering; Estimating the Degradation Function - Estimation by Image Observation, Experimentation and Modeling; Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Geometric Mean Filter; Geometric Transformations: Spatial Transformations, Gray-Level Interpolation | 04 04 03 04 | 15 |
| 5 | april | UNIT-V : | Color Image Processing: Color Fundamentals, Color Models; Pseudocolor Image Processing; Full-Color Image Processing, Color Transformations: Formulation, Color Complements, Color Slicing, Tone and Color Corrections, Histogram Processing; Smoothing and Sharpening, Color Segmentation, Noise in Color Images. Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, The | 04 03 03 02 03 | 15 |

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| | | | Hit-or-Miss Transformation, Some Basic Morphological Algorithms: Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning; Extensions to Gray-Scale Images. | | |
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| 6 | may | UNIT- VI : | <p>Image Segmentation: Detection of Discontinuities: Point, Line, Edge Detection; Edge Linking and Boundary Detection: Local Processing, Global Processing via the Hough Transform, Global Processing via Graph-Theoretic Techniques; Thresholding: Role of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Optimal Global and Adaptive Thresholding, Use of Boundary Characteristics for Histogram Improvement and Local Thresholding, Thresholds Based on Several Variables; Region-Based Segmentation: Region Growing, Region Splitting and Merging</p> | 04 04 03 04 | 15 |
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4S : Software Testing

| Sr. No. | Month | Name of Unit | Topics Names | Required Lecture | Total Lects. |
|---------|------------|--------------|---|--|--------------|
| 1 | Dec jan | UNIT-I : | . Testing: Introduction and Outline - Introduction to testing and test outline, sample application, incremental testing approach, outline approach steps, evaluation and schedule estimation. | 04 03 03 02 03 | 15 |
| 2 | Jan feb | UNIT-II : | Introduction to test outline to test cases, creating test cases, documentation short cuts, introduction to using tables and spreadsheets, sample application, Documenting test cases. | 04 04 03 04 | 15 |
| 3 | Feb mar | UNIT-III : | Introduction to test outline to test cases, creating test cases, documentation short cuts, introduction to using tables and spreadsheets, sample application, Documenting test cases. | 04 03 03 02 03 | 15 |
| 4 | mar | UNIT-IV : | Testing Web Applications: Introduction, sample application, functional and usability issues, configuration and compatibility testing, reliability and availability, security | 04 04 03 04 | 15 |

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| | | | testing, database testing, post implementation testing. | | |
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| 5 | april | UNIT-V : | Reducing the No. of test cases: Introduction, prioritization guidelines, priority category scheme, Risk analysis, interviewing to identify problem areas, combination schemes, tracking selected test cases. | 04 03 03 02 03 | 15 |
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| 6 | may | UNIT- VI : | Creating Quality Software: Introduction, development environmental infrastructure, software testing environment, software testing tools, applying software standards to test documentation. | 04 04 03 04 | 15 |
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