PUNE DISTRICT EDUCATION ASSOCIATION'S

MAMASAHEB MOHOL COLLEGE

48/1A, Erandwane, Paud Road, Pune - 411038(Maharashtra) India

DEPARTMENT OF COMPUTER SCIENCE

Course Outcome

M.Sc. –I (Computer Science)

Name: Dipali Yogesh Jadhav

Class: MSC-I(Comp.Sci.) **Sem – I**

Course Name: Principles of Programming Languages

Course code: CS-101

Course outcomes:

CO 1. Helps to understand how language features work.
CO2. Develop a greater understanding of the issues involved in programming language design and implementation
CO 3. Develop thorough understanding of the compilation process
CO4. Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
CO 5.To Implement several programs in languages other than the core curriculum (Java/C++)

Course MSC-I(Comp.Sci.)	**Course Specific Outcome CSO**	**Methodology**	**Reference Book**	**No. of Lectures**
Introduction The Art of Language Design Why Study Programming Languages? Compilation and Interpretation Programming Environments	To understand reasons behind learning programming languages. To get the knowledge of what makes language successful. To understand Programming Environments.	Lecture	Scott Programming Language Pragmatics	2
Non-Imperative Programming Models Basic LISP Primitives Procedure definition and binding Procedure Abstraction and Recursion **Turbo Prolog** Introduction, facts, Objects and Predicates, Variables, Using Rules, Controlling execution fail and cut predicates	understand Basic lisp primitives used in LISP. get the knowledge of Predicates and conditional. understand Procedure abstraction and Recursion.	Demonstrative	Introduction to Turbo Prolog LISP	10
Names, Scopes, and Bindings The Notion of Binding Time	understand Object Lifetime and Storage Management.	Lecture	Scott Programmin	5

Scope Rules The meaning of Names in a Scope The Binding of Referencing Environments Macro Expansion	get The meaning of Names in a Scope. understand The Binding of Referencing Environments		g Language Pragmatics	
Control Flow Expression Evaluation Structured and Unstructured Flow Iteration Recursion	get knowledge of Structured and Unstructured Flow. understand Selection using Short-Circuited Conditions, Case/Switch Statements understand the concept of Recursion.	Constructive	Scott Programmin g Language Pragmatics	5
Data Types Primitive Data Types Numeric Types User defined Ordinal types Implementation of pointer and reference types	get knowledge of various data types. get Solution to dangling pointer problem understand concept of Heap management	Lecture	Scott Programmin g Language Pragmatics	8
Subroutines and Control Abstraction Fundamentals of Subprograms Local Referencing Environments Parameter-Passing Methods The General Semantics of Calls and Returns Implementing Subprograms with Stack-Dynamic Local Variables	get knowledge various Parameter-Passing Methods . Implementing Subprograms with Stack-Dynamic Local Variables Implementing Dynamic Scoping.	Constructive	Scott Programmin g Language Pragmatics	5
Data Abstraction and Object Orientation Object-Oriented Programming Initialization and Finalization Dynamic Method Binding Multiple Inheritance	learn Encapsulation and Inheritance. understand Dynamic Method Binding . understand Multiple Inheritance.	Lecture	Scott Programmin g Language Pragmatics	8
Concurrency Introduction Introduction to Subprogram-level concurrency Semaphores Java Threads	understand the concept of Semaphores. get knowledge of Message Passing. understand how to create Java Threads.	Constructive	Scott Programmin g Language Pragmatics	5

References:

- Scott Programming Language Pragmatics, 3e(With CD) ISBN 9788131222560 Kaufmann Publishers, An Imprint of Elsevier, USA
- Introduction to Turbo Prolog by Carl Townsend
- LISP 3rd edition by Patrick Henry Winston & Berthold Klaus Paul Horn (BPB)

Dipali Yogesh jadhav
M.Sc(Comp.Sci.)
Mamasaheb Mohol College

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DEPARTMENT OF COMPUTER SCIENCE

Name of the Teacher: Sulekha Magar

Class: MSc- Sem –I(Advance Networking) Pattern : 2013 (Semester)

Course Code - 102

Course Outcomes: Cos: Advance Networking.

CO1 : 1. To uncover and understand the current directions of computer networks from literature readings.

CO2: 2. To "fill-in" gaps in students' networking knowledge.

CO3: 3.To advance skills of literature searching and literature review.

Course : CS102 MSC-I(Sem-1)	Course Specific Outcome(CSO)	Methodology	Reference Book	No of Lectures
Review of Basic Concepts	1.1.students will learn about the different Internet Protocols.	Lecture	TCP / IP Protocol Suite.	3
The Internet Layer Protocols	2.1. Students will be able to learn about protocols like IPv4, IPv6. 2.2.Advanced protocols like ICMPv4, ICMPv6.	Lecture	TCP / IP Protocol Suite.	4
Routing Protocols.	3.1.At the end of this chapter students will have the knowledge about different connecting devices. 3.2.Different Routing Algorithms like RIP, Multicast Routing etc.	Lecture	TCP / IP Protocol Suite.	6
The Transport Layer.	4.1.students will get the in depth knowledge of the Transport Layer. 4.2. Elements of Transport Protocols, UDP, TCP.	Constructive	TCP / IP Protocol Suite.	6
Multimedia.	5.1.In the we are going to learn about the media Audio and Video how to use this on internet. 5.2. Different protocols like RTP, RTCP, Voice Over IP.	Constructive	TCP / IP Protocol Suite.	3
Introduction To Security	6.1.In this students will learn how to protect our data in the Network through different Algorithms. 6.2.Types of Attacks.	Constructive	Computer Networks.	2

Cryptography: Concepts and Techniques.	Students will learn the different security algorithms using Symmetric and Asymmetric key.	Constructive	Cryptography and Network Security.	3
Symmetric Key Algorithms.	8.1.Students will get In depth Knowledge of the Symmetric Key. 8.2.Algorithms types and modes.	Constructive	Cryptography and Network Security.	4
Asymmetric key Algorithms.	9.1.students will get In depth Knowledge of the Asymmetric Key and Algorithms.	Constructive	Cryptography and Network Security.	2
Digital Certificates.	10.1 Students will able to apply the Digital Certificates to the real world.	Constructive	Cryptography and Network Security.	2
Internet Security Protocols.	11.1. In this students will get the knowledge of how to protect the data over internet, mails etc.	Constructive	Cryptography and Network Security.	10
User Authentication.	12.1At the end we are going to learn about Authenticating users from Internet. 12.2. Authentication using Certificate-based Authentication		Cryptography and Network Security.	4

Types of Evaluation: Diagnostic evaluation Test to identify Slow Learner and Fast Learner.
Formative and Summative Evaluation

1) Formative Evaluation : Knowledge, Understanding, Application, Skills
2) Summative Evaluation: Term End Examination and University Examination.

References:

1. TCP / IP Protocol Suite- Behrouz A. Forouzan.
2. Computer Networks- Andrew Tanenbaum.
3. Cryptography and Network Security by Atul Kahate

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DEPARTMENT OF COMPUTER SCIENCE

Name: Prof. Pandit Supriya P.

Class: MSC-I(Comp.Sci.)

Course Name: Distributed Database Concepts

Course code: CS-103

Course Outcomes:

Upon successful completion of this lab course, students will be able to

1) CO1: Understands the architecture, design issues, integrity control, query processing and optimization, transactions, distributed transaction reliability.
2) CO2: Understands the techniques used for data fragmentation, replication, and allocation during the distributed database design process.
3) CO3: Makes the Evaluation of simple strategies for executing a distributed query to select the strategy that minimizes the amount of data transfer.
4) CO4: Understands the two-phase commit protocol is used to deal with committing a transaction that accesses databases stored on multiple nodes.
5) CO5: Understands the distributed concurrency control based on the distinguished copy techniques and the voting methods.

Course MSC-I(Comp.Sci.) (103)	Course Specific Outcome CSO	Methodology	Reference Book	No. of Lectures
1. Distributed databases: An overview 1.1 Features of distributed Vs centralized databases 1.2 Why DDB? DDBMS 1.3 Promises / problem areas in implementing a DDB	1: Student will understand Features of distributed Verses centralized databases. 2: Understands Data Fragmentation, Replication and allocation techniques for DDBMS.	Lecture & Constructive	Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions ISBN: 0-07-010829-3	02
2. DDBMS Architecture 2.1 DBMS Standardization from 2.2 Architectural models for DDBMS 2.3 DDBMS architecture 2.4 Distributed catalog management Section	1: Understands DDBMS architecture: cluster federated, parallel databases and client server architecture, Standardization.	Constructive	Principles of Distributed Database Systems; 2nd Edition By M. Tamer Ozsu and Patrick Valduriez Publishers: Pearson Education Asia ISBN: 81-7808-375-2	04
3. Distributed database design 3.1 Alternative design strategies 3.2 Distributed design issues	Implement the design issues, design strategies and concept of graph, fragmentation and allocation.	Use of ICT	Principles of Distributed Database Systems; 2nd Edition By M. Tamer Ozsu and Patrick Valduriez	10

3.3 Concepts of join graphs 3.4 Fragmentation and allocation			Publishers: Pearson Education Asia ISBN: 81-7808-375-2 2. Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions ISBN: 0-07-010829-3	
4. Overview of Query processing 4.1 Query processing problems 4.2 Objectives of query processing 4.3 Complexity of relational algebra operators 4.4 Characterization of query processors 4.5 Layers of query processing	1: Understands objectives of query processing, Complexity of Relational Algebra operations; characterization of Query processors; Layers of Query Processing. 2: Understands Transaction concept, Properties of Transaction.	Constructive	Principles of Distributed Database Systems; 2nd Edition By M. Tamer Ozsu and Patrick Valduriez Publishers: Pearson Education Asia ISBN: 81-7808-375-2	04
5. Query decomposition & data localization 5.1 Query decomposition Chapter 5.2 Localization of distributed data	1. Understands the concept of query decomposition and localization of distributed data.	Constructive	Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions	02
6. Optimization of distributed queries 6.1 Query optimization Centralized query optimization Join ordering in fragment queries. Distributed query optimization algorithms 6.2 Centralized query optimization 6.3 Join ordering in fragment queries 6.4 Distributed query optimization algorithms	1: Understands the Query optimization concept, Centralized query optimization and Join ordering in fragment queries. 2: Implements the Centralized query optimization and Join ordering in fragment queries. 3: Implements Distributed query optimization algorithms and problems.	Lecture	Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions	10
7. Management of distributed transactions 7.1 Framework for transaction management 7.2 Supporting atomicity of distributed transactions 7.3	1: Understands the Framework for transaction management. 2: Use/implements atomicity, concurrency control of	Lecture	Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill	02

Concurrency control of distributed transactions 7.4 Architectural aspects of distributed transactions	distributed transactions.		International Editions ISBN: 0-07-010829-3	
8. Concurrency control 8.1 Foundations of distributed concurrency control 8.2 Distributed deadlocks 8.3 Concurrency control based on timestamps 8.4 Optimistic methods for distributed concurrency	1: Understands distributed concurrency control and distributed deadlock, Concurrency control based on timestamps and Optimistic methods for distributed concurrency.	Lecture	Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions	06
9. Distributed DBMS reliability 9.1 Reliability concepts & measures 9.2 Failures & fault tolerance in distributed systems from book 1 9.3 Failures in DDBMS 9.4 Local reliability protocols 9.5 Distributed reliability protocols 9.6 Dealing with site failures 9.7 Network partitioning	1: Understands the Reliability concepts & measures, Failures & fault tolerance in distributed systems. 2: Understands Local reliability protocols, Distributed reliability protocols and Network partitioning.	Lecture	Principles of Distributed Database Systems; 2nd Edition By M. Tamer Ozsu and Patrick Valduriez Publishers: Pearson Education Asia ISBN: 81-7808-375-2	08

Reference Books:

1. Principles of Distributed Database Systems; 2nd Edition By M. Tamer Ozsu and Patrick Valduriez Publishers: Pearson Education Asia ISBN: 81-7808-375-2

2. Distributed Database; Principles & Systems By Stefano Ceri and Giuseppo Pelagatti Publications: McGraw-Hill International Editions ISBN: 0-07-010829-3

3. Database systems (2nd edition) By Raghuramakrishnan and Johannes

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DEPARTMENT OF COMPUTER SCIENCE

Name: Prof. Pandit Supriya P.

Class: MSC-I(Comp.Sci.)

Course Name: Design and Analysis of Algorithms (DAA)

Course code: CS-104

Course Outcomes:

Upon successful completion of this lab course, students will be able to

1) CO1: Use the Basic Algorithm Analysis techniques and asymptotic notations
2) CO2: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Perform algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3) CO3: Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
4) CO4: Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.
5) CO5: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.

Course MSC-I(Comp.Sci.) (103)	Course Specific Outcome CSO	Methodology	Reference Book	No. of Lectures
Analysis Algorithm definition, space complexity, time complexity, worst case –best case – average case complexity, asymptotic notation, sorting algorithms (insertion sort, heap sort) , sorting in linear time, searching algorithms, recursive algorithms (Tower of Hanoi , Permutations).	CSO1: Understand space complexity, time complexity, worst case –best case – average case complexity, asymptotic notation. CSO2: Implements sorting algorithms (insertion sort, heap sort), sorting in linear time, searching algorithms, recursive algorithms (Tower of Hanoi , Permutations).	Lecture & Constructive	A. Aho, J. Hopcroft, & J. Ullman, The Design and Analysis of Computer Algorithms,	06
Design strategies Divide and conquer-control abstraction, binary search, merge sort, Quick sort, Strassen's matrix multiplication	CSO1: Analyze and implement Divide and conquer-control abstraction, binary search, merge sort, Quick sort, Strassen's matrix multiplication.	Constructive	Donald Knuth, The Art of Computer Programming (3 vols., various editions, 1973-81), Addison Wesley	06

	CSO2: Solve the merge sort, quick sort and binary search problems.			
Greedy method - knapsack problem, job sequencing with deadlines,minimum-cost spanning trees, Kruskal and Prim's algorithm, optimal storage on tapes, optimal merge patterns, Huffman coding	CSO1: Understand the algorithm of knapsack problem, job sequencing with deadlines, Kruskal and Prim's, optimal storage on tapes. CSO2: Solve the knapsack problem, job sequencing with deadline problems, minimum-cost spanning trees, Kruskal and Prim's algorithm, optimal storage on tapes, optimal merge patterns and Huffman coding problems.	Lecture	A. Aho, J. Hopcroft, & J. Ullman, The Design and Analysis of Computer Algorithms, Donald Knuth, The Art of Computer Programming (3 vols., various editions, 1973-81), Addison Wesley	08
Dynamic programming- matrix chain multiplication, . single source shortest paths, Dijkstra's algorithm, Bellman-ford algorithm , all pairs shortest path, longest common subsequence, string editing, 0/1 knapsack problem, Traveling salesperson problem.	CSO1: Understand the algorithm and solve the problems of matrix chain multiplication. single source shortest paths, Dijkstra's algorithm, Bellman- ford algorithm , all pairs shortest path, longest common subsequence, string editing, 0/1 knapsack problem, Traveling salesperson problem. CSO2: Identify the time complexity of each problem.	Constructive	The Algorithm Manual, Steven Skiena, Springer, Computer Programming (3 vols., various editions, 1973-81), Addison Wesley	08
Decrease and conquer DFS and BFS, Topological sorting, connected components	CSO1: Understand and solve the problems on DFS and BFS, Topological sorting, connected components.	Lecture with chalk and board	Donald Knuth, The Art of Computer Programming	06
Backtracking: General method, 8 Queen's problem, Sum of subsets problem, graph coloring problem, Hamiltonian cycle	CSO1: Understand the General method and algorithms on 8 Queen's problem, Sum of subsets problem, graph coloring	Lecture	The Algorithm Manual, Steven Skiena, Springer	04

	problem, Hamiltonian cycle. CSO2: Solve the 8 Queen's problem, Sum of subsets problem, graph coloring problem, Hamiltonian cycle problems.			
Branch and Bound Technique : FIFO, LIFO, LCBB, TSP problem, 0/1 knapsack problem	CSO1: Understand and solve the FIFO, LIFO, LCBB, Travelling Salesperson Problem (TSP), 0/1 knapsack problems.	Lecture	A. Aho, J. Hopcroft, & J. Ullman, The Design and Analysis of Computer Algorithms, Donald Knuth,	04
Transform and conquer:- Horner's Rule and Binary Exponentiation – Problem Reduction –	CSO1: Get the knowledge on Horner's Rule and Binary Exponentiation – Problem Reduction. CSO2: Draw AVL Trees and solve the Gaussian Elimination Problems.	Lecture	A. Aho, J. Hopcroft, & J. Ullman, The Design and Analysis of Computer Algorithms, Donald Knuth,	04
Problem classification Nondeterministic algorithm, The class of P, NP, NP-hard and NP- Complete problems, significance of Cook's theorem	CSO1: Understand Nondeterministic algorithms and preliminary issues of decision problems and optimization problems. CSO2: Define the class of P, NP, NP-hard and NP-Complete problems, significance of Cook's theorem.	Lecture	The Algorithm Manual, Steven Skiena, Springer ISBN:9788184898651	02

Reference Books -

1) A. Aho, J. Hopcroft, & J. Ullman, The Design and Analysis of Computer Algorithms, M.Sc.(CS) syllabus for affiliated colleges Page 21 of 42 Addison Wesley, 1974

2) Donald Knuth, The Art of Computer Programming (3 vols., various editions, 1973-81), Addison Wesley

3) The Algorithm Manual, Steven Skiena, Springer ISBN:9788184898651

4) Graphs, Networks and Algorithms, Jungnickel, Springer, ISBN: 3540219056

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DEPARTMENT OF COMPUTER SCIENCE

Name: Prof. Bobade Harshada

Class: MSC-I(Comp.Sci.)

Course Name: Network Programming

Course code: CS-105

CO 1) Understanding of the most important principles of how computer communication works .

CO 2) Knowledge of simple network programming (sockets) and higher abstractions

Course- M.S.c (CS)(Sem-I) CS-105	**Course Specific Outcome CSO**	**Methodology**	**Reference book**	**No. of Lectures**
Introduction : • A Simple Daytime Client, Protocol Independence, Error Handling: Wrapper Functions, A Simple Daytime Server	To understand the communication between client and server. To describe wrapper functions by using socket programming.	Demostrative	Books 1	**02**
Sockets Introduction Socket Address Structures, Value-Result Arguments, Byte Ordering Functions, Byte Manipulation Functions, readn, writen, and readline Functions, isfdtype Function. What is a Socket?, Using Sockets	To understand the description of socket API. To understand socket by using various functions.	Lecture	Books 1,2	**06**
Elementary TCP Sockets socket Function, connect Function, bind Function, listen Function, accept Function, fork and exec Functions, Concurrent Servers, close Function, getsockname and getpeername Functions	To understand the key protocols which support the Internet. To describe major technologies and protocols used in network communications.	**Lecture**	Book 1	**04**

TCP Client-Server Example TCP Echo Server: main Function, TCP Echo Server: str_echo Function, TCP Echo Client: main Function, TCP Echo Client: str_cli Function, Normal Startup, Normal Termination, Connection Abort before accept Returns, Termination of Server Process, SIGPIPE Signal, Crashing of Server Host, Crashing and Rebooting of Server Host, Shutdown of Server Host	To understand handling TCP clients by using diffent input	**Lecture**	Books 1	**06**
I/O Multiplexing: The select and poll Functions Text mining Applications, Process and Tools, Web content, structure and usage mining	To understand different types of multiplexing function.	**Lecture**	Books 1	**06**
Socket Options getsockopt and setsockopt Functions, Obtaining the Default, Socket States, Generic Socket Options, IPv4 Socket Options, ICMPv6 Socket Option, IPv6 Socket Options, TCP Socket	To Understand the ways to get and set the options that affect a socket .	**Lecture**	Book 2	**04**
Elementary UDP Sockets ecvfrom and sendto Functions, UDP Echo Server: UDP Echo Server: dg_echo Function, UDP Echo Cl, UDP Echo , dg_cli Function, Lost Datagrams, Verifying Received Response, Server Not Running, Summary of UDP example, connect Function with UDP, dg_cli Function ,Lack of Flow Control with UDP, Determining Outgoing Interface with UDP, TCP and	To understand the functions calls for atypical UDP client/server.		Book 2	**08**

UDP Echo Server User Datagram Protocol, File Transfer, Error Handling				
Protocols, Sessions, State, and Implementing Custom Protocols State vs. Stateless, Methods for Maintaining State, What Is a Protocol?, Designing a Custom Protocol, Our Chat Protocol, Protocol Registration	To learn the layers of TCP and sessions.	**Lecture**	Book 2	**04**
Elementary Name, Address Conversions and design decisions Domain Name System, gethostbyname Function, RES_USE_INET6 Resolver Option, gethostbyname2 Function and IPv6 Support, gethostbyaddr Function, uname Function, gethostname Function, getservbyname and getservbyport Functions [Book-1] • TCP vs. UDP, Application Protocol Choices, Client-Server Architecture, Client-Side Considerations, Server-Side Considerations	To learn about DNS.	**Lecture**	Book 2	**08**

References:

T1: Unix Network Programming, Volume 1: The Sockets Networking API, 3/E by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, PHI

T2: The Definitive Guide to Linux Network Programming by KEIR DAVIS, JOHN W. TURNER, AND NATHAN YOCOM, Apress.

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DEPARTMENT OF COMPUTER SCIENCE

Name: Dipali Yogesh Jadhav

Course Name: Digital Image Processing **Sem - II**

Class : Msc-I (Comp.Sci.)

Course code: CS-201

Course Outcomes:

- **CO 1**. The fundamentals of digital image processing
- **CO 2**. Image transform used in digital image processing
- **CO 3**. Image enhancement techniques used in digital image processing
- **CO 4.** Image restoration techniques and methods used in digital image processing
- **CO 5**. Image compression and Segmentation used in digital image processing

Course **Msc-I (Comp.Sci.)**	Course Specific Outcome CSO	Methodology	Reference Book	No. of Lectures
Introduction Definition of Digital Image Processing Examples of Fields that Use Digital Image Processing Fundamental Steps in Digital Image Processing	To implement various bands in imaging	Constructive	Digital Image Processing	4
Digital Image Fundamentals Elements of Visual Perception Image Sampling and Quantization mage Operations on a Pixel Basis	Elements of Visual Perception Image sensing and Acquisition	Lecture	Digital Image Processing	4
Image Enhancement in the Spatial Domain Some Basic Gray Level Transformations Histogram Processing Linear and Order-Statistics Filters Enhancement	To get Histogram Processing To understand various filtering	Lecture	Digital Image Processing	8
Image Enhancement in the Frequency Domain Introduction	To get knowledge of various transformation To apply Image Smoothing Using Frequency Domain	Lecture	Digital Image Processing	7

Frequency-Domain Filters Frequency Domain Filtering	Filters			
Image Restoration A Model of the Image Degradation Estimating the Degradation Function Filter	To get knowledge of Frequency Domain Filtering To apply Noise Models on images	Lecture	Digital Image Processing	5
Color Image Processing Color Fundamentals Transformations Histogram Processing	To apply Erosion and Dilation To implement Morphological Algorithms	Lecture	Digital Image Processing	5
Morphological Image Processing Some Basic Concepts from Set Theory The Hit-or-Miss Transformation Some Basic Morphological Algorithms	To understand Point, Line, and Edge Detection To implement Thresholding	Constructive	Digital Image Processing	4
Image Segmentation Detection of Discontinuities Basic Global Thresholding Region-Based Segmentation	To understand Point, Line, and Edge Detection To implement Thresholding	Use of ICT	Digital Image Processing	6
Representation and Description Chain Codes Boundary Descriptors Topological Descriptors Relational Descriptors	To apply Boundary Descriptors on image To implement various Representation on images	Constructive	Digital Image Processing	5

References:

- Gonzalez, R. C. and Woods, R. E. [2002/2008], Digital Image Processing, 2nd/3rd ed., Prentice

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DEPARTMENT OF COMPUTER SCIENCE

Name: Prof. Pandit Supriya P.

Course Name: Advanced Operating System **Sem - II**

Class : Msc-I (Comp.Sci.)

Course code: CS-202

Upon successful completion of this lab course, students will be able to

1) CO1: Use UNIX/LINUX OS in practical implementation.
2) CO2: Understands the programming interface to the Unix/Linux system - the system call interface.
3) CO3: Understanding of the functions of Operating Systems. It also provides provide an insight into functional modules of Operating Systems.
4) CO4: Understand and implement process management, signal handling and thread management.

Course Msc-I (Comp.Sci.)	Course Specific OutcomeCSO	Methodology	Reference Book	No. of Lectures
Introduction to UNIX/Linux Kernel • System Structure, User Perspective, Assumptions about Hardware, Architecture of UNIX Operating System (TextBook-3: Chapter Topics: 1.2, 1.3, 1.5, 2.1) • Concepts of Linux Programming- Files and the Filesystem, Processes, Users and Groups, Permissions, Signals, Interprocess Communication	Understands system structure, file system, Processes, user groups, permissions	Constructive	Linux System Programming, O'Reilly, by Robert Love.	3
File and Directory I/O • Buffer headers, structure of the buffer pool, scenarios for retrieval of a buffer, reading and writing disk blocks, inodes, structure of regular file, open, read, write, lseek, close, pipes, dup • open, creat, file sharing, atomic operations, dup2, sync, fsync, and fdatasync, fcntl, /dev/fd, stat, fstat, lstat, file types, Set-User-ID and Set-Group-ID, file access	1. Understand file and directory I/O. 2. Understands file system calls, permissions, ownership, access functions of file and directory.	Lecture	Linux System Programming, O'Reilly, by Robert Love. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard	13

permissions, ownership of new files and directories, access function, umask function, chmod and fchmod, sticky bit, chown, fchown, and lchown, file size, file truncation, file systems, link, unlink, remove, and rename functions, symbolic links, symlink and readlink functions, file times, utime, mkdir and rmdir, reading directories, chdir, fchdir, and getcwd, device special files • Scatter/Gather I/O, Mapping Files into Memory, Advice for Normal File I/O, I/O Schedulers and I/O Performance, Directories, Copying and Moving files, Device Nodes, Out-of-Band			Stevens.	
Process Environment, Process Control and Process Relationships • Process states and transitions, layout of system memory, the context of a process, saving the context of a process, sleep, process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, changing the size of the process, The Shell, Process Scheduling • Process termination, environment list, memory layout of a C program, shared libraries, environment variables, setjmp and longjmp, getrlimit and setrlimit, process identifiers, fork, vfork, exit, wait and waitpid, waitid, wait3 and wait4, race conditions, exec, changing user IDs and group IDs,system function, user identification, process times • The		Lecture	The Design of the UNIX Operating System, PHI, by Maurice J. Bach. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Stevens. Linux System Programming, O'Reilly, by Robert Love	14

Process ID, Running a New Process, Terminating a Process, Waiting for Terminated Child Processes, Users and Groups, Daemons, Process Scheduling, Yielding the Processor, Process Priorities, Processor Affinity				
Memory Management • The Process Address Space, Allocating Dynamic Memory, Managing Data Segment, Anonymous Memory Mappings, Advanced Memory Allocation, Debugging Memory Allocations, Stack-Based Allocations, Choosing a Memory Allocation Mechanism, Manipulating Memory, Locking Memory, Opportunistic • Swapping, Demand Paging	Understands Memory mapping, allocation, debugging, manipulation, locking memory. Get the knowledge of swapping and demand paging	Lecture	The Design of the UNIX Operating System, PHI, by Maurice J. Bach. Linux System Programming, O'Reilly, by Robert Love	06
Signal Handling • Signal concepts, signal function, unreliable signals, interrupted system calls, reentrant functions, SIGCLD semantics, reliable-signal technology, kill and raise, alarm and pause, signal sets, sigprocmask, sigpending, sigsetjmp and siglongjmp, sigsuspend, abort, system function revisited, sleep• Signal Concepts, Basic Signal Management, Sending a Signal, Reentrancy, Signal Sets, Blocking Signals, Advanced Signal Management, Sending a Signal with a Payload	Get the knowledge of signal concept, various different signals, advanced signals etc	Lecture	Linux System Programming, O'Reilly, by Robert Love. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Stevens.	06
Windows Thread Management • Thread Internals o Data Structures, Kernel Variables, Performance Counters, Relevant Functions, Birth of a Thread Examining Thread Activity : Limitations on Protected Process Threads, Worker Factories (Thread Pools) • Thread Scheduling o	Understands Thread Internals, scheduling, window scheduling, context switching etc	Lecture	Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard	06

Overview of Windows Scheduling, Priority Levels, Windows Scheduling APIs, Relevant Tools, Real-Time Priorities, Thread States, Dispatcher Database, Quantum, Scheduling Scenarios, Context Switching, Idle Thread, Priority Boosts			Stevens.	

Recommended Text:

1. Linux System Programming, O'Reilly, by Robert Love.

2. Windows Internals, Microsoft Press, by Mark E. Russinovich and David A. Soloman.

3. The Design of the UNIX Operating System, PHI, by Maurice J. Bach.

4. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Stevens.

Prof. Supriya P. Pandit

Department of Computer Science

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PUNE DISTRICT EDUCATION ASSOCIATION'S

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DEPARTMENT OF COMPUTER SCIENCE

Name: Prof. Pokhalekar Deepashree

Course Name: Data Mining and Data Warehousing **Sem - II**

Class : Msc-I (Comp.Sci.)

Course code: CS-204

Course outcome

1) Learn to mine/dig data deeply.
2) Understands to maintain database on large scale.
3) Various statistical methods for mine the data.
4) Creation of data warehouse
5) Data mining applications.

Course Msc-I (Comp.Sci.)	Course Specific Outcome CSO	Methodology	Reference Book	No. of Lectures
Introduction to Data Mining • Basic Data Mining Tasks • DM versus Knowledge Discovery in Databases • Data Mining Issues • Data Mining Metrics • Social Implications of Data Mining • Overview of Applications of Data Mining	i) Data mining tasks, KDD process ii) Data mining issues and metrics iii)Social implications and applications of data mining	Constructive	Data Mining: Concepts and Techniques, Han, Elsevier	4
Introduction to Data Warehousing • Architecture of DW • OLAP and Data Cubes • Dimensional Data Modeling-star, snowflake schemas • Data Preprocessing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction • Machine Learning • Pattern Matching	-i) Architecture of data warehouse, OLAP ii) Data cube and dimensional data modeling iii) Data preprocessing technique, learns Machine learning, pattern matching	Lecture	Margaret H. Dunham, S. Sridhar, Data Mining – Introductory and Advanced Topics, Pearson Education	4
Data Mining Techniques • Frequent item-sets and Association rule mining: Apriori algorithm, Use of sampling for frequent item-set, FP tree	i)Understands statistical methods like frequent item sets, association rule ii)Learns apriori	Lecture	Raghu Ramkrishnan , Johannes Gehrke, Database	4

algorithm • Graph Mining: Frequent sub-graph mining, Tree mining, Sequence Mining	algorithm, FP tree algorithm, use of sampling technique iii)Tree mining and sequence mining		Management Sysstems, Second Edition, McGraw Hill International	
Classification & Prediction • Decision tree learning: [3 hrs] Construction, performance, attribute selection Issues: Over-fitting, tree pruning methods, missing values, continuous classes Classification and Regression Trees (CART) • Bayesian Classification: [6 hrs] • Bayes Theorem, Naïve Bayes classifier, • Bayesian Networks • Inference • Parameter and structure learning • Linear classifiers [4 hrs] • Least squares, logistic, perceptron and SVM classifiers • Prediction [3 hrs] • Linear regression • Non-linear regression	i)Decision tree technique-construction, performance, attribute selection Over-fitting issues, tree pruning methods ii)Classification and regression technique, bayesain classification iii)Bayesian networks and theorm iv)Understands parameter and structure learning v)Linear regression, prediction	Lecture	Margaret H. Dunham, S. Sridhar, Data Mining – Introductory and Advanced Topics, Pearson Education	16
Accuracy Measures Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap	i)Precision and recall technique ii)F-measure, confusion matrix, learns cross validation technique iii)Bootstrap technique	Lecture	Margaret H. Dunham, S. Sridhar, Data Mining – Introductory and Advanced Topics, Pearson Education	4
Clustering • k-means M.Sc.(CS) syllabus for affiliated colleges Page 32 of 42 • Expectation Maximization (EM) algorithm • Hierarchical clustering, Correlation clustering	i)Learns k-means clustering ii) Expectation maximization algorithm iii) Hierarchical clustering	Lecture	Data Mining: Concepts and Techniques, Han, Elsevier	4

Brief overview of advanced techniques • Active learning • Reinforcement learning • Text mining • Graphical models • Web Mining	i) Active learning technique, Reinforcement learning ii) Text mining, web mining iii) Graphical models	Constructive	Data Mining: Concepts and Techniques, Han, Elsevier	4

Reference Books:

1. Data Mining: Concepts and Techniques, Han, Elsevier ISBN:9789380931913/ 9788131205358

2. Margaret H. Dunham, S. Sridhar, Data Mining – Introductory and Advanced Topics, Pearson Education

3. Tom Mitchell, —Machine Learning‖, McGraw-Hill, 1997

4. R.O. Duda, P.E. Hart, D.G. Stork. Pattern Classification. Second edition. John Wiley and Sons, 2000.

5. Christopher M. Bishop, —Pattern Recognition and Machine Learning‖, Springer 2006

6. Raghu Ramkrishnan, Johannes Gehrke, Database Management Sysstems, Second Edition, McGraw Hill International

7. Ian H.Witten, Eibe Frank Data Mining: Practical Machine Learning Tools and Techniques, Elsevier/(Morgan Kauffman), ISBN:9789380501864

8. [Research-Papers]: Some of the relevant research papers that contain recent results and developments in data mining field

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DEPARTMENT OF COMPUTER SCIENCE

Name of the Teacher : Sulekha Magar

Class : Msc-Sem –II(Artificial Intelligence) Pattern : 2013 (Semester II)

Course Outcomes : Cos : Artificial Intelligence

CO1 : 1. Find appropriate idealizations for converting real world problems into AI search problems formulated using the appropriate search algorithm.

CO1 : 2.Implement and execute by hand alpha-beta search. Design good evaluation functions and strategies for game playing.

CO3 : 3.Given a real world supervised learning problem, choose and implement appropriate learning algorithms such as decision trees, support vector machines, and boosting.

Course : Elective MSC-I(Sem-2)	**Course Specific Outcome(CSO)**	**Methodology**	**Reference Books**	**No of Lectures**
Introduction to Artificial Intelligence.	1.1.Understand and implement search and adversarial (game) algorithms. 1.2. Demonstrate practical experience by implementing and experimenting with the learnt algorithms	Lecture	Artificial Intelligence , Tata McGraw Hill.	5
Problems, Problem Spaces and Search.	2.1 Students can be able to define the problem precisely 2.2. Able to Isolate and represent the task knowledge that is necessary to solve the problem.	Lecture	Computational Intelligence , Eberhart, Elsevier	5
Heuristic Search Techniques.	At the end of the class you should be able to : 3.1. Devise an useful heuristic function for a problem. 3.2. predict the space and time requirements for best-first and A $*$ search.	Lecture	Artificial Intelligence , Tata McGraw Hill	4
Knowledge Representation..	4.1. Students satisfying the prerequisites are expected to understand the fundamental principles of logic-based Knowledge Representation. 4.2. understand how the theoretical material covered in the course is currently being applied in practice.	Constructive	Artificial Intelligence , Tata McGraw Hill.	5

Slot – and – Filler Structures.	At the end of this lesson the student should be able to do the following: 5.1. Represent a real life problem in terms of semantic networks and frames. 5.2. Apply inference mechanism on this knowledge-base.	Constructive	Artificial Intelligence : A New Synthesis, Nilsson, Elsevier.	4
Game Playing.	By the end of the course, students should be able to accomplish the following: 6.1. Identify aspects of computer games that can benefit from the use of artificial intelligence. 6.2. Implement a variety of artificial intelligence and machine learning techniques for traditional and modern computer games.	Constructive	Computational Intelligence, Eberhart, Elsevier.	3
Learning	7.1. Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems. 7.2. 7.2.Design AI functions and components involved in intelligent systems, such as computer games, expert systems, semantic web, information retrieval, machine translation, mobile robots, decision support systems, and intelligent tutoring systems	Constructive	Computational Intelligence, Eberhart, Elsevier.	4

Types of Evaluation: Diagnostic evaluation Test to identify Slow Learner and Fast Learner.

Formative and Summative Evaluation

1) Formative Evaluation: Knowledge, Understanding, Application, Skills

2) Summative Evaluation: Term End Examination and University Examination.

Development of E-content/E-Module and made available on Google and Website

References:

1. Computational Intelligence, Eberhart, Elsevier.
2. Artificial Intelligence, Tata McGraw Hill.
3. Artificial Intelligence: A New Synthesis, Nilsson, Elsevier.