

III Year – I Semester

Object Oriented Software Engineering

UNIT 1 The Scope of Object Oriented Software Engineering: Historical Aspects, Economic Aspects, Maintenance Aspects, Requirements, Analysis and Design Aspects, The ObjectOriented Paradigm, Terminology, Ethical Issues

Software Life-Cycle Models : Software Development In Theory, Risks and other aspects of Iteration and Incrementation, Managing Iteration and Incrementation, Other Life-Cycle Models : Code-and-Fix, Waterfall, Rapid-Prototyping, Open Source, Agile Processes, Synchronize-and-Stabilize, Spiral Models, Comparison of Life-Cycle Models.

UNIT 2 The Software Process : The Unified Process, Iteration and Incrementation, The Requirements Workflow, The Analysis workflow, The Design workflow, The Implementation Workflow, The Test workflow, Post Delivery Maintenance, Retirement, The Phases of the unified Process, One- versus Two-Dimensional Life cycle models, Improving the Software process, Capability Maturity Models, Costs and Benefits of software process improvement.

Teams: Team Organization, Democratic Team Approach, Chief Programmer Team Approach, Synchronize and Stabilize Teams, Teams for Agile Processes, Open Source Programming Teams, People Capability Maturity Model, Choosing an appropriate Team

UNIT 3 Testing: Quality Issues, Non -Execution-Based Testing, Execution-Based Testing, What should be Tested ?, Testing versus Correctness proofs, who should perform ExecutionBased Testing ?, When Testing Stops

Modules to Objects: What is a Module ?, Cohesion, Coupling, Data Encapsulation, Abstract Data Types, Information Hiding, Objects, Inheritance , Polymorphism and Dynamic Binding, The Object-Oriented Paradigm

Reusability and Portability: Objects and Reuse, Reuse during design and Implementation, Reuse and Post Delivery Maintenance, Portability, Techniques for achieving portability.

Planning and Estimating: Planning and the software Process, Estimating Duration and Cost, Components of a software project Management plan , Software project Management Plan Framework, Planning Testing, Training Requirements, Documentation Standards.

UNIT 4 The Requirements Workflow : Determining what client needs, Overview of the Requirements, Understanding the Domain, The Business Model, Initial requirements, What are Object-oriented Requirements, Rapid Prototyping, Human Factors, Reusing the rapid prototype, Metrics for the Requirement Workflow, Challenges of the Requirements Workflow

The Analysis Workflow: The Specification Document, Informal Specifications, The Analysis Workflow, Extracting the Entity Classes,

Challenges of the Analysis workflow.

The Design Workflow : Object-Oriented Design, The Design Workflow, Formal techniques for Detailed Design, Real-time Design Techniques, CASE tools for Design, Metrics for Design, Challenges of the Design Workflow.

UNIT 5

The Implementation workflow : Choice of Programming Language, Good Programming practice, Coding Standards, Code Reuse, Integration, The Implementation Workflow, Test case selection, Black-Box Unit Testing Techniques, Glass-Box Unit Testing Techniques, Code walkthroughs and Inspections, Comparison of Unit testing techniques, Clean room, Testing Issues, Integration Testing, Product Testing, Acceptance Testing, Metrics for the Implementation workflow, Challenge of the Implementation Workflow.

Postdelivery Maintenance : Why postdelivery maintenance IS necessary, what is required of postdelivery Maintenance Programmers ?, Management of Postdelivery Maintenance, Maintenance Issues, Reverse Engineering, Testing during postdelivery Maintenance, Metrics for Postdelivery Maintenance, Challenges for the Postdelivery Maintenance

Text books

	Author	Title	Publisher
1	Stephen R.Schach	Object Oriented Software Engineering	Mc Graw Hill Higher Education

Reference Books

	Author	Title	Publisher
1	Timothy C.Lethbridge, Robert Laganieri	Object Oriented Software Engineering	Mc Graw Hill, 2 nd Edition

III Year – I Semester

Advanced Data Structures

- UNIT 1 Elementary Structures :** Stack, Queue, Double-Ended Queue, Dynamic allocation of nodes, Shadow copies of Array-based structures
Search Trees : Two models of search trees, General properties and transformations, height of a search tree, basic find, insert and delete, Returning from leaf to root, Dealing with nonunique keys, Queries for the keys in an interval, Building optimal search trees, converting trees into lists ,Removing a tree
- UNIT 2 Balanced search trees :** Height-balanced trees, weight balanced trees, Red-Black Trees and trees of almost optimal height, Top-down rebalancing for red-black trees, Trees with Constant Update Time at a Known Location, Finger Trees and Level Linking, Trees with Partial Rebuilding: Amortized Analysis, Splay Trees: Adaptive Data Structures, Skip Lists: Randomized Data Structures, Joining and Splitting Balanced Search Trees
- UNIT 3 Tree structures for sets of Intervals :** Interval trees, segment trees, trees for the union of intervals, Tree for sums of weighted intervals, Tree for interval restricted maximum sum queries, Orthogonal range trees, Higher dimension segment trees
Heaps : Balanced search trees as heaps, array based heaps, Heap-ordered trees and Half-ordered trees, Leftist heaps, skew heaps
- UNIT 4 Data Structure Transformations :** Making structures dynamic, making structures persistent
Data structures for Strings : Tries and compressed Tries, Dictionaries allowing errors in Queries, Suffix Trees, Suffix Arrays
- UNIT 5 Hash Tables :** Basic hash tables and collision resolution, Universal families of hash functions, perfect hash functions, Hash trees, extendible hashing, Membership testers and bloom filters

Text Books :

1. Advanced Data structures, Peter Brass, Cambridge University Press

Reference Books :

1. Advanced Data structures, Erik Demaine, Spring '12 Scribe Notes Collection

II Year – II Semester

Principles of Programming Languages

Unit 1	Introduction : What is a programming language, Abstractions in programming languages, Computational paradigms, Language definition, Language translation, Language design. History: The first programmer, The 1950s : The first programming languages, The 1960s : An explosion in programming languages, The 1970s : Simplicity, abstraction, study, The 1980s : New directions and the rise of object –orientation, The 1990s : Consolidation, The Internet, libraries and scripting, The future. Language Design Principles: History and design criteria, Efficiency, regularity, Further language design principles, C++ : A Case study in language design. 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, Lexical vs Syntax vs Semantics
Unit 2	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. Data Types : Data types and type information, Simple types, Type constructors, Type equivalence, Type Checking, Type conversion, Polymorphic type checking, Explicit polymorphism.
Unit 3	Control – I: Expressions and Statements: Expressions, Conditional Statements and Guards, Loops and Variation on “while”, The “goto” controversy, Exception handling. Control – II : 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 in C, C++ name spaces 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 4	Object – Oriented Programming : Software reuse and independence, Java : objects, Classes and methods, Inheritance, Dynamic binding, C++, Small Talk, 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.

	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.
Unit 5	Formal Semantics: A Sample small language, Operational semantics, Denotational semantics, Axiomatic semantics, Proofs of program corrections. Parallel programming : Introduction to parallel processing, Parallel processing and programming languages, Threads, Semaphores, Monitors, Message passing, Parallelism in non-imperative languages.

Text Books

1. Kenneth C. Louden Programming Languages Principles and Practice Second Edition, Cengage Learning (2008). Chapters:1through 14

Reference Books

1. Terrence W. Pratt & Mervin V. Zelkowitz Programming Languages Design and Implementation Fourth Edition, Pearson Education (2008)
2. Robert W. Sebesta Concepts of Programming Languages Pearson Education 2001



III Year I Semester

ARTIFICIAL INTELLIGENCE

Unit 1 **What is AI?** : The AI Problems, The Underlying Assumption, What is AI Technique?, The level of the Model, Criteria for Success.

Problems, Problem spaces & Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the design of Search Programs, Additional Problems.

Heuristic search techniques: Generate and Test, Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means Ends Analysis.

Unit 2 **Knowledge Representation Issues:** Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction

Representing knowledge using Rules: Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning, Matching, Control Knowledge

Unit 3 **Symbolic Reasoning under Uncertainty:** Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation: Depth-First Search, Implementation: Breadth-First Search

Weak slot & filler Structures: Semantic Nets, Frames

Unit 4 **Planning :** Overview, An Example Domain : The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing

Unit 5 **Commonsense:** Qualitative Physics, Commonsense Ontologies, Memory Organisation, Case-Based Reasoning

Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition

Text books

	Author	Title	Publisher
1	Rich & Knight	Artificial Intelligence	TMH (1991)

Reference books

	Author	Title	Publisher
1	Winston. P.H	Artificial Intelligence	Addison Wesley (1993)



III Year – I Semester

Database Management Systems

Unit 1 Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the scene, Advantages of the using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas and Instances, Three Schema architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems.

Data Modeling Using the ER Model: Conceptual Data models, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship sets, roles and structural Constraints, Weak Entity types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.

The Enhanced Entity-Relationship Model: Sub classes, Super classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of Union Types using Categories, An Example University ERR Schema, Design Choices and Formal Definitions.

Unit 2 The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations.

The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus.

SQL-99: Schema Definition, Constraints, Queries and Views: SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.

Unit 3 Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas, Functional dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Relational Database Design Algorithms and Further Dependencies: Properties of

Relational Decompositions, Algorithms for Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies, Other Dependencies and Normal Forms.

Unit 4 Disk Storage, Basic File Structures and Hashing: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing file Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access using RAID Technology.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B⁺ Trees, Indexes on Multiple Keys, Other Types of Indexes.

Unit 5 Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing schedules Based on Serializability.

Concurrency Control Techniques: Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation concurrency control Techniques, Granularity of Data Items and multiple Granularity Locking.

Distributed Databases and Client Server Architectures: Distributed Database Concepts, Data Fragmentation, Replication, and allocation Techniques for Distributed Database Design, Types of Distributed Database Systems, An Overview of 3 Tier Client Server Architecture.

Text books

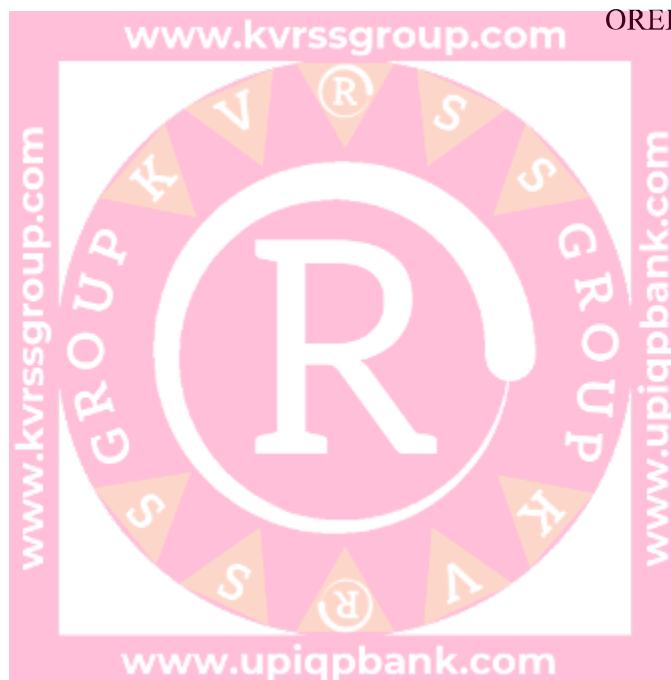
Author	Title	Publisher
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1 Elmasri.R and Navathe.S	Fundamentals of Database Systems.	Pearson Education (2007)
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Chapters: 1.1 to 1.6, 2, 13.1 to 13.10, 14, 3.1 to 3.6, 3.9, 4.1 to 4.5, 5, 6, 8, 10, 11, 17, 18.1 to 18.5, 25.1 to 25.3, 25.6

Reference books

	Author	Title	Publisher
1	Peter Rob, Carlos Coronel	Database Systems– Design, Implementation and Management	Eigth Edition, Thomson (2008)
2	C.J. Date, A.Kannan, S.Swamynathan	An Introduction to Database Systems	VII Edition Pearson Education (2006).
3	Raman A Mata – Toledo, Panline K. Cushman	Database Management Systems	Schaum’s Outlines, TMH (2007)
4	Steven Feuerstein	Oracle PL/SQL – Programming	10 th Anniversary Edition, OREILLY (2008)



III Year – I Semester

Scripting Languages & Web Design

- UNIT 1** **Introduction:** Introduction to the Internet, WWW, Web Browsers, URL, MIME, HTTP, Security.
XHTML: Introduction, Editing XHTML, First XHTML Example, W3C XHTML Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements.
CSS: Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking External Style, Positioning Elements, Backgrounds, Element Dimensions, Box Model and Text Flow, Media Types, Building a CSS Drop-Down Menu, User Style Sheets.
- UNIT 2** **JavaScript:** Introduction to Scripting, Control Statements I, Control Statements II, Functions, Arrays, Objects, Document Object Model, Events.
XML and RSS: Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definition, W3C XML Schema Documents, XML Vocabularies, Extensible style sheet language and XSL Transformations, Document Object Model, RSS.
- UNIT 3** **Ajax-Enabled Rich Internet Applications-** Introduction, Traditional Web Applications Vs. Ajax Applications, RIAs with Ajax, History of Ajax, Raw Ajax Example using the XMLHttpRequest Object, Using XML and the DOM, Creating a Full-Scale Ajax Enabled Application
Web Servers(IIS and Apache): Introduction, HTTP Transactions, Multitier Application Architecture, Client-Side Scripting Versus, Accessing Web Servers, Microsoft Internet Information, Apache HTTP Server, Requesting Documents.
- UNIT 4** **Databases:** SQL, MYSQL,
The Basics of Perl: Origins and Uses of Perl, Scalars and their operations, Assignment Statements, Control Statements, Arrays, Hashes, References, Functions, Pattern Matching, File Input & Output.
Using Perl for CGI Programming: CGI, CGI Linkage, Query String Format, The CGI.pm Module, Cookies.
- UNIT 5** **PHP:** Introduction, PHP basics, String Processing and Regular Expressions, Form Processing and Business Logic, Connecting to a Database, Using Cookies, Dynamic Content, Operator Precedence Chart.
JSF: Introduction, Java Web Technologies, Creating and Running a Simple Program, JSF Components, Session Tracking

Text books

	Author	Title	Publisher
1	Harvey M. Deitel and Paul J. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition
2	ROBERT W SEBESTA	Programming with World Wide Web	Pearson Education; 4 th edition.



III Year – I Semester Web Technologies LAB

1. Write a HTML page to provide internal document linking.
2. Create HTML page with 2 frames, one is to hold links, other one is large frame that provides the main view. When user clicked on link, appropriate HTML file should display in the second frame.
3. Create HTML page for the time table of class work using table.
4. Write a java program to demonstrate RMI server and client .
5. Write a java script that reads five integers and determines the largest and the smallest.
6. Write a Java Script to find duplicate elements of an array.
7. Write validation function using Java script for validating alphabets and numbers in a form.
8. Write a VB script which generates a different greetings, each time the script is executed.
9. Write a VB script to read a string from user and display the same in uppercase.
10. Create a web page for a shopping mall that allows the user to tick of his purchases and obtain the bill with total amount.
11. Write the VB script to store the value into a cookies and to read the values from the cookie
12. Create a HTML page with inline and embedded style sheets.
13. Demonstrate the use of external style sheet.
14. Illustrate different types of filter on a sample text.
15. Display the record information from the text file using tabular data control and apply sorting and filtering.
16. Create a XML document to store 5 student information (roll no., name, class)
17. Write a Servlet to validate the user login.
18. Create a Servlet to count the number of visits to a web page.
19. Create a JSP page to redirect the request to other page.
20. Write a JSP program to prepare Employee pay bill.

III Year – I Semester Database Management Systems Lab

Cycle-I

Aim: Marketing company wishes to computerize their operations by using following tables.

Table Name: Client- Master

Description: Used to store client information

Column Name	Data Type	Size	Attribute
CLIENT_ NO	Varchar2	6	Primary key and first letter must start with 'C'
NAME	Varchar2	20	Not null
ADDRESS 1	Varchar2	30	
ADDRESS S	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product_ Master

Description: Used to store product information

Column Name	Data Type	Size	Attribute
PRODUCT_ NO	Varchar2	6	Primary key and first letter must start with 'P'
DESCRIPTION	Varchar2	15	Not null
PROFIT_ PERCENT	Number	4,2	Not null
UNIT_ MEASUE	Varchar2	10	
QTY_ ON_ HAND	Number	8	
REORDER_ LVL	Number	8	
SELL_ PRICE	Number	8, 2	Not null, cannot be 0
COST_ PRICE	Number	8,2	Not null, cannot be 0

Table Name: Salesman_ master

Description: Used to store salesman information working for the company.

Column Name	Data Type	Size	Attribute
SALESMAN_ NO	Varchar2	6	Primary key and first letter must start with 'S'
SALESMAN_ NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	

ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	
SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: SALES-ORDER

Description: Used to store client's orders

Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key and first letter must start with 'S'
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/ full(f) and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values ("In Process", "Fulfilled", "Back Order", "Cancelled.

Table Name: SALES_ORDER_DETAILS

Description: Used to store client's order with details of each product ordered.

Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES_ORDER table
PRODUCT_NO	Varchar2	6	Foreign Key references SALES_ORDER_table
QTY_ORDERED	Number	8	
QTY_DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables.

1. Retrieve the list of names, city and the state of all the clients.
2. List all the clients who are located in 'Mumbai' or 'Bangalore'.
3. List the various products available from the product_master table.
4. Find the names of sales man who have a salary equal to Rs.3000.
5. List the names of all clients having 'a' as the second letter in their names.
6. List all clients whose Bal due is greater than value 1000.

7. List the clients who stay in a city whose first letter is 'M'.
8. List all information from sales-order table for orders placed in the month of July.
9. List the products whose selling price is greater than 1000 and less than or equal to 3000.
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50.
11. Find the products in the sorted order of their description.
12. Find the products with description as '540HDD' and 'Pen drive'.
13. Count the total number of orders.
14. Print the description and total qty sold for each product.
15. Calculate the average qty sold for each client that has a maximum order value of 15,000.
16. Find all the products whose quantity on hand is less than reorder level.
17. List the order number and day on which clients placed their order.
18. Find out the products and their quantities that will have to deliver in the current month.
19. Find the names of clients who have placed orders worth of 10000 or more.
20. Find the client names who have placed orders before the month of June,2008.

Cycle-II

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.

Supplier (Supplier_No, Sname, City, status)

Part(Part_no, pname, color, weight, city, cost)

Shipment (supplier_No, Part_no, city)

JX(project_no, project_name, city)

SPJX (Supplier_no, part_no, project_no, city)

1. Get supplier numbers and status for suppliers in Chennai with status > 20.
2. Get project names for projects supplied by supplier S.
3. Get colors of parts supplied by supplier S₁.
4. Get part numbers for parts supplied to any project in Mumbai.
5. Find the id's of suppliers who supply a red or pink parts.
6. Find the pnames of parts supplied by London supplier and by no one else.
7. Get the names of the parts supplied by the supplier 'Mart' and 'Miller'.
8. Get supplier names for suppliers who do not supply part P₂.
9. Get all pairs of supplier numbers such that the suppliers concerned are "colocated".
10. Get suppliers names for the suppliers who supply at least one red part.

Cycle –III Employee Database

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)

Dept(Deptno, Dname, Loc)

1. List the details of employees who have joined before the end of September' 81.
2. List the name of the employee and designation of the employee, who does not report to anybody.
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary)
4. List the names of employees who are more than 2 years old in the organization.
5. Determine the number of employees, who are taking commission.
6. Update the employee salary by 20% , whose experience is greater than 12 years.
7. Determine the department does not contain any employees.
8. Create a view, which contains employee name and their manager names working in sales department.
9. Determine the employees, whose total salary is like the minimum salary of any department.
10. List the department numbers and number of employees in each department.
11. Determine the employees, whose total salary is like the minimum salary of any department.
12. List average salary for all departments employing more than five people.
13. Determine the names of employees, who take highest salary in their departments.
14. Determine the names of employees, who earn more than their managers.
15. Display ename, dname, even if no employee belongs to that department (use outer join)

Cycle- IV

An Airline system would like to keep track their information by using the following relations.

FLIGHTS(fl_no: integer, from: string, to: string, distance: integer, price: integer)

AIRCRAFT(aid: integer, aname: string, cruising_range: integer)

CERTIFIED(eid: integer, aid: integer)

Employees(eid: integer, ename: string, salary: real)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries.

1. Find the names of pilots whose salary is less than the price of the cheapest route from Newyork to Chicago.

2. For each pilot who is certified for more than 2 aircraft, find the eid's and the maximum cruising range of the aircraft that he or she certified for.
3. For all aircraft with cruising range over 1,500 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
4. Find the aid's of all aircraft than can be used from chicaga to LosAngels.
5. Find the name of the pilots certified from some Boeing aircraft.
6. Print the enames of pilots who can operate planes with cruising range greater than 3,500 miles, but are not certified by Boeing aircraft.
7. Find the eid's of employees who are certified for exactly 2 aircrafts.
8. Find the total amount paid to employees as salaries.
9. Find the aid's of all than can be used on non-stop flights from Chennai to Dubai.
10. Find the eid's of employee who make second highest salary.

PL/SQL PROGRAMS

1. Write a PL/SQL program to check the given number is strong or not.
2. Write a PL/SQL program to check the given string is palindrome or not.
3. Write a PL/SQL program to swap two numbers without using third variable.
4. Writ a PL/SQL program to generate multiplication tables for 2, 4, 6.
5. Write a PL/SQL program to check the given number is Amstrong or not.
6. Write a PL/SQL code to find the factorial of any number.
7. Write a PL/SQL program to display sum of even numbers and sum of odd numbers in the given range.
8. Write a PL/SQL program to check the given number is palindrome or not.
9. The HRD manager has decide to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table.
10. Write a PL/SQL program to display to 10 rows in Emp table based on their job and salary.
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table.
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%.
13. Write a PL/SQL procedure to prepare an electricity bill by using following table.

Table used: Elect

Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

III Year – I Semester Software Engineering Lab

- Introduction and project definition
- Software requirements Specification
- Introduction to UML and use case diagrams
- System modeling (DFD and ER)
- Flow of events and activity diagram
- OO analysis: discovering classes
- Interaction diagrams: sequence and collaboration diagrams
- Software Design: software architecture and object- oriented design
- State Transition Diagram
- Component and deployment diagrams
- Software testing



III Year – II Semester Accounting & Financial Management

Unit 1	Accounting Concepts, Double Entry System, Journal-Ledger-Trial Balance, Final Accounts
Unit 2	Cost Classification and Analysis, Marginal Costing, Budget – Budgetary Control
Unit 3	Standard Costing, Finance Function, Financial Decision Making
Unit 4	Financial Analysis
Unit 5	Working Capital Management

Text books

Author	Title	Publisher
1 K. Rajeswara Rao and G. Prasad	Accounting and Finance	Jaibharat Publishers, 2002

Reference books

Author	Title	Publisher
1 Vanherne & James C, John M. Wechowicz JR	Fundamentals of Financial Management	PHI, 2002.
2 Horngren, Sundem Ellictt	Introduction to Financial Accounting	Pearson Education-2002
3 Ambrish Gupta	Financial Accounting for Management	Third Edition, Pearson Education (2009)
4 Paresh Shah	Basic Financial Accounting for Management	Oxford Higher Education (2008)

III Year – II Semester Internet of Things

- UNIT 1 IoT Ecosystem Concepts and Architectures :** Internet of Things Definition Evolution : IoT Emergence – Internet of Everything – Industrial IoT – Smartness in IoT; IoT Architectures: SOA based architecture, API Oriented Architecture; Resource Management: Resource Partitioning – Computation Offloading – Identification and Resources/Service discovery; IoT Data Management and Analytics: IoT and the Cloud – Real time analysis in IoT and Fog Computing ; Communication Protocols : Network Layer (RFID, IEEE 802.11, WPAN, M2M, IPV4, IPV6)– Transport and Application Layer(UDP,TCP); Internet of Things Applications- Monitoring and Actuating - Business process and Data Analysis – Information Gathering and collaborative consumption .
Open Source Semantic Web Infrastructure for Managing IoT Resources in the Cloud : Open IoT Architecture for IoT/Cloud Convergence, Scheduling process and IoT life cycle, Scheduling and Resource Management
- UNIT 2 Fog Computng :** Introduction – Definition and Characteristics – Reference Architecture – Applications : Health Care – Augmented Reality – Caching and Reprocessing.
IoT Enablers and Solutions : Embedded Device Programming Languages (nesC ,Keil C , Dynamic C, B#) – Message Passing in Devices(RPC, REST, CoAP) – Coordination Languages(Linda and Elinda , Orc, Jolie) – Polyglot Programming – IoT Approaches – Existing IoT Frameworks
- UNIT 3 IoT Data Knowledge and Management :** The Foundations of Stream Processing in IoT , Continuous Logic Processing System
Framework for Distributed Data Analysis : Preliminaries - Anomaly Detection – Problem statement and Definitions – Distributed Anomaly Detection – Efficient Incremental Local Modelling
- UNIT 4 Governing IoT:** IoT Governance : Overview - An Integrated Governance Idea – Governance Models – Important Governance Issues – Existing Approaches - New Paradigms .
IoT Applications: Applied Internet of Things : Scenario – Architecture Overview - Sensors – The Gateway – Data Transmission.
- UNIT 5 Case Study : Socket Programming , Developing a simple Math Server; Internet of Things:** Programming IoT Devices, Web Services and IoT Clients

Text Books:

1. Internet of Things , Principles and Paradigms – Rajkumar Buyya & Amir Vahid Dastjerdi, Elsevier – Morgan Kaufmann
(Topics : 1.2.1,1.2.2,1.2.3,1.2.4,1.3,1.4,1.5,1.6,1.7,2.3,2.4,2.5, 4.1,4.3,4.4,4.5, 5.2.2, 5.2.3, 5.2.4,5.2.5,5.3.2, 5.3.3, 8.2,8.3, 9.2,9.3,9.4,9.5,9.6, 12.3,15.2, 15.3,15.4,15.5,15.6).
2. Web Reference : <https://www.codeproject.com/Articles/853183/Internet-of-Things-Programming-IoT-Devices-Web-Ser>
3. Socket Programming - Raj kumar buyya (Chapter 13)

III Year – II Semester

Architectures of Operating Systems

UNIT 1	Introduction to Kernel - Architecture of the UNIX operating system, System concepts, Data structures. Buffer Cache: Buffer header, Structure of Buffer pool, Reading and writing disk blocks. Files INODES, Structure of a regular file, Directories, Super block, Inode assignment.
UNIT 2	System calls - OPEN, Read, Close, Write, Create, CHMOD, CHOWN, Pipes, Mounting and Unmounting. Process - Layout the system memory, Context, Process control, process creation, signals, Process scheduling, time, clock.
UNIT 3	Inter process Communications : Inter-Process Communications - Process tracing, System V IPC, Shared Memory, Semaphores. Network Communications - Socket programming: Sockets, descriptors, Connections, Socket elements, Stream and Datagram Sockets.
UNIT 4	Windows System Components : Windows Operating system - versions, Concepts and tools, Windows internals, System Architecture, Requirements and design goals, Operating system model, Architecture overview, Key system components. System mechanisms -Trap dispatching, object manager, Synchronization, System worker threads, Windows global flags, Local procedural calls, Kernel event tracing.
UNIT 5	Registry and Process Management : Windows Management Mechanisms - The registry, Registry usage, Registry data types, Local structure, Trouble shooting Registry problems, Registry Internals, Services, Applications, Accounts, Service control Manager, Windows Management Instrumentation, Processes, Threads, and Jobs: Process Internals, Flow of create process, Thread Internals, Examining Thread creation, Thread Scheduling, Job Objects.

Text Books :

1. Maurice J. Bach, The Design of the Unix Operating System, Prentice Hall of India, 1991
2. Mark E. Russinovich and David A. Solomon, Microsoft® Windows® Internals, Microsoft Press, 2004

Reference Books :

1. William Stallings, “Operating Systems: Internals and Design Principles”, 5th Edition, Prentice Hall, 2005.

III Year – II Semester Data Sciences

UNIT I : INTRODUCTION TO BIG DATA AND HADOOP

Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.

UNIT II : HDFS(Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT III : Map Reduce

Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

Unit IV : Hadoop Eco System

Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.

Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.

Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS.

Big SQL : Introduction

UNIT V : Data Analytics with R

Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering, Big Data Analytics with BigR.

Text Books

- Tom White “ Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012.
- Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

Reference Books

- Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.
- Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
- Tom Plunkett, Mark Hornick, “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, McGraw-Hill/Osborne Media (2013), Oracle press.
- Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
- Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.

- Glen J. Myat, “Making Sense of Data”, John Wiley & Sons, 2007
- Pete Warden, “Big Data Glossary”, O’Reily, 2011.
- Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
- ArvindSathi, “BigDataAnalytics: Disruptive Technologies for Changing the Game”, MC Press, 2012
- Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan.



IV Year – I Semester

Cloud Computing

- Unit 1 Era of Cloud Computing :** Getting to know the cloud - Peer-To-Peer, Client-Server, and Grid Computing – Cloud computing versus Client-server Architecture - Cloud computing versus Peer-To-Peer Architecture - Cloud computing versus Grid Computing - How we got to the Cloud - Server Virtualization versus cloud computing - Components of Cloud computing – Cloud Types – Cloud Computing Service delivery Models.
- Introducing Virtualization :** Introducing Virtualization and its benefits – Implementation levels of Virtualization – Virtualization at the OS Level – Virtualization Structure – Virtualization Mechanisms – Open Source Virtualization Technology – Binary Translation with Full Virtualization – Virtualization of CPU, Memory and I/o Devices – Hardware support for Virtualization in Intel x86 Processor -
- Unit 2 Cloud Computing Services:** Infrastructure as a Service – Platform as a Service – Language and Pass – Software as a Service – Database as a Service.
- Open Source Cloud Implementation and Administration:** Open-source Eucalyptus Cloud Architecture – Open-source Openstack Cloud Architecture.
- Unit 3 Application Architecture for Cloud:** Cloud Application Requirements – Recommendations for Cloud Application Architecture – Fundamental Requirements for Cloud Application Architecture – Relevance and use of Client-server architecture for Cloud Applications – Service oriented Architecture for Cloud Applications.
- Cloud Programming:** Programming support for Google Apps Engine – Big Table as Google's NOSQL System – Chubby as Google Distributed Lock Service – Programming support for Amazon EC2 – Elastic Block Store (ESB).
- Unit 4 Risks, Consequences and Costs for Cloud Computing :** Introducing Risks in Cloud Computing – Risk Assessment and Management – Risk of Vendor Lock-in – Risk of Loss Control – Risk of Not Meeting Regulatory Compliances – Risk of Resource Scarcity – Risk in Multi Tenant Environment – Risk of Failure – Risk of Failure of Supply Chain – Risk of Malware and Internet attacks – Risk of Inadequate SLA – Risk of Management of Cloud Resources – Risk of Network Outages – Risks in the Physical Infrastructure – Legal Risk due to Legislation – Risks with Software and Application Licensing – Security and Compliance Requirements in a Public Cloud – Direct and Indirect Cloud Costs – Calculating Total cost of Ownership for Cloud Computing – Cost Allocations in a Cloud .
- AAA administration for clouds :** The AAA Model, Single Sign-on for Clouds – Industry Implementations for AAA- Authentication management in the Cloud – Authorization management in the Cloud .
- Unit 5 Application Development for cloud :** Developing On-Premise Versus Cloud Applications – Modifying Traditional Applications for Deployment in the Cloud – Stages during the development process of Cloud Application - Managing a Cloud Application – Using Agile Software Development for Cloud Applications – Cloud Applications : What Not to do - Static code analysis for cloud applications – Developing Synchronous and Asynchronous Cloud Applications .
- Mobile Cloud Computing :** Definition of Mobile Cloud Computing – Architecture of

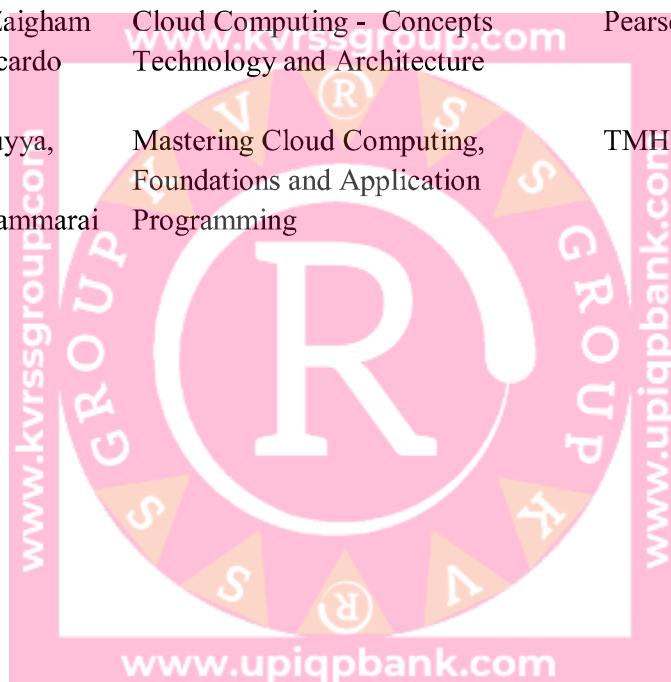
Mobile Cloud Computing – Benefits of Mobile Cloud Computing – Mobile Cloud Computing Challenges

Text books

	Author	Title	Publisher
1	Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde Dr. Deven Shah	Cloud Computing, Black Book	Dreamtech press ()

Reference books

	Author	Title	Publisher
1	Thomas Erl, Zaigham Mahmood, Ricardo Puttini	Cloud Computing - Concepts Technology and Architecture	Pearson
2	Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi	Mastering Cloud Computing, Foundations and Application Programming	TMH



III Year – II Semester Data Analytics Lab

1. (i) Perform setting up and Installing Hadoop in its two operating modes:
 - Pseudo distributed
 - Fully distributed.(ii) Use web based tools to monitor your Hadoop setup.
2. (i) Implement the following file management tasks in Hadoop:
 - Adding files and directories
 - Retrieving files
 - Deleting filesii) Benchmark and stress test an Apache Hadoop cluster
3. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
 - Find the number of occurrence of each word appearing in the input file(s)
 - Performing a MapReduce Job for word search count (look for specific keywords in a file)
4. Stop word elimination problem : **Input:** A large textual file containing one sentence per line and A small file containing a set of stop words (One stop word per line)
Output: A textual file containing the same sentences of the large input file without the words appearing in the small file.
5. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data. 8. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg)
9. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.
10. Install, Deploy & configure Apache Spark Cluster. Run apache spark applications using Scala.

III Year – II Semester R Programming Lab

- R and Rstudio set-up
- R types, vectors and writing functions
- More R types, vectorization and efficient R code
- Importing data, time series data and Google Trends
- A data science project – a first look
- Data manipulation with tidyr
- Plotting with ggplot2
- R style guide, git integration, projects in RStudio
- Maps, plots and Amazon's choice for a next office building



ELECTIVE – I : COMPUTER GRAPHICS

Unit 1 Overview of Computer Graphics: Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Raster Scan Systems, Random Scan Systems, Input Devices.

Graphical User Interfaces and Interactive Input Methods: The User Dialogue, Windows and Icons, Input of Graphical Data, Input Functions

Unit 2 Output Primitives: Points and Lines, Line-Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, Line Function, Circle Generation Algorithms, Ellipse Generation Algorithms

Unit 3 Attributes of output Primitives: Line Attributes, Color and GrayScale levels, Area Fill Attributes, Character Attributes, Bundled Attributes, Antialiasing.

Unit 4 Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representation and Homogenous Coordinates, Composite Transformations, Other Transformations.

Two Dimensional Viewing: The Viewing pipeline, Viewing Coordinates Reference Frame, Window to Viewport Coordinate Transformations, Two Dimensional Viewing Functions, Clipping Operations, Point Clipping, Line Clipping; Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping.

Unit 5 Three Dimensional Concepts: Three Dimensional Display Methods.

Three Dimensional Object Representations: Polygon Surfaces, Quadric Surfaces, Superquadrics.

Three Dimensional Geometric and Modeling Transformations: Translation, Rotation, Scaling, Other Transformations, Composite Transformations, Three Dimensional Transformation Functions.

Three Dimensional Viewing: Viewing pipeline, Viewing Coordinates, Projections, Clipping

Text books

Author	Title	Publisher
1 Donald Hearn and M. Paulin Baker	Computer Graphics	PHI (Second Edition)

Reference books

	Author	Title	Publisher
1	Shalini Govil-Pai	Principles of Computer Graphics – Theory and Practice using open GL and Maya	Springer (2007)
2	ISRD group	Computer Graphics	ace series, TMH (2006)
3	Amearendra N. Sinha, Arun D Udai	Computer Graphics	TMH (2008)



ELECTIVE I: CONCURRENT AND PARALLEL COMPUTING

- UNIT 1** **Introduction to Parallel Computing:** Motivating Parallelism-Scope of parallel computing-Parallel programming platforms-Implicit Parallelism- Limitations of Memory System Performance-Dichotomy of Parallel computing platforms-Physical organization of parallel platforms-Communication costs in parallel machinesRouting mechanisms for inter connection networks.
- UNIT 2** - **Principles of Parallel Algorithm Design** Preliminaries-Decomposition techniques-characteristics of tasks and interactions-mapping techniques for load balancing-methods for containing interaction overheads-parallel algorithm models.
- UNIT 3** **Basic Communication Operations** One to all broadcast and all to one reduction-all to all broadcast and reduction -scatter and gather –sources of overhead in parallel programs-performance metrics for parallel systems-the effect of granularity on performance.
- UNIT 4** **Programming Using Message Passing Paradigm** Principles of message passing programming-Building blocks-Message passing interfaceTopologies and embedding-Overlapping computation with communication-Collective communication and computation operation
- UNIT 5** **Programming Shared Address Space Platforms** Thread basics-Why threads?-POSIX thread-Thread basics-Synchronization primitives in Pthreads-controlling thread and synchronization attributes-Composite synchronization constructs-Case study:Implementation of Chat Server

Text Books :

1. Ananth Grama ,Vipin Kumar,"Introduction to parallel computing",Second edition,2007
2. Cameron Hughes,Tracey Hughes,"Parallel and Distributed Programming using C++.Pearson education,2005

Reference Books :

1. Quinn, M. J., Parallel Computing: Theory and Practice (McGraw-Hill Inc.).
2. Bary Wilkinson and Michael Allen: Parallel Programming Techniques using Networked of workstations and Parallel Computers, Prentice Hall, 1999.
3. R. Buyya (ed.) High Performance Cluster Computing: Programming and Applications, Prentice Hall, 1999

ELECTIVE I: SOFT COMPUTING

UNIT 1	Introduction to Artificial Neural Networks, Fundamentals of biological neural networks, McCulloch Pitt's Neuron Model, The Perceptron, Basic principles of ANNs, Activation Functions, Types of Neural Networks –Single Layer, Multilayer, Feed Forward, Recurrent, Learning Paradigms, Learning Rules, Back Propagation Learning Algorithm.
UNIT 2	Competitive Neural Networks, Kohonen's Self Organizing Maps, Neo-cognitron Neural Networks, Associative Memory Networks, Hopfield and Bidirectional Associative Memory.
UNIT 3	Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Operations on Fuzzy Relations, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems and Fuzzy Decision Making.
UNIT 4	Genetic Algorithms, Analogy to Nature's evolution theory, Survival of the fittest, Chromosome Encoding Schemes, Population initialization and selection methods, Evaluation function, Genetic operators: Cross over, Mutation, genetic parameters, Rank Operations, Fitness Scaling, Inversion, Ant Colony Optimization, Particle swarm optimization.
UNIT 5	Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Fuzzy Filtered Neural Networks, GA based Neural Networks, Fuzzy based GA, Case Studies.

Text Books :

1. J.S.R. Jang, C.T. Sun and E. Mizutani, Neuro-Fuzzy and Soft Computing, Prentice-Hall of India, 2011.
2. Samir Roy, UditChakraborty, Introduction to Soft Computing, Neuro Fuzzy and Genetic Algorithms, Pearson Education, 2013.
3. David E Goldberg, Genetic Algorithms in Search, Optimization and Machine Learning, Pearson Education, 2013.

Reference Books :

1. Sathish Kumar, Neural Networks A Class Room Approach 2 Edition, McGraw Hill Education India Private Ltd., 2013.
2. S. N. Sivanandam, S. Sumathi and S. N. Deepa, Introduction to Fuzzy Logic using MATLAB, Springer, 2007.
3. Randy L. Haupt, Sue Ellen Haupt, Practical Genetic Algorithms, 2 Edition, Wiley and Sons, 2004.
4. S. Rajasekaran and G.A.V. Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms, Prentice-Hall of India, 2003.