

# Acharya Nagarjuna University

## Centre for Distance Education


Nagarjuna Nagar, Guntur-522510

**MASTER OF COMPUTER SCIENCE (CS)**

Programme Code: 109

### PROGRAMME STRUCTURE

Course Code	Course Name	Internal Assessment	External Assessment	Max. Marks	Credits
<b>FIRST YEAR: Semester-1</b>					
101CP24	Data Structures in C	30	70	100	4
102CP 24	Object Oriented Programming with Java	30	70	100	4
103CP24	Operating Systems	30	70	100	4
104CP24	Probability and Statistics	30	70	100	4
105CP24	Computer Organization	30	70	100	4
106CP24	Data Structures using C LAB	-	-	100	3
107CP24	JAVA Programming LAB	-	-	100	3
<b>FIRST YEAR: Semester-2</b>					
201CP24	Database Management Systems	30	70	100	4
202CP24	Design & Analysis of Algorithms	30	70	100	4
203CP24	Software Engineering	30	70	100	4
204CP24	Computer Networks	30	70	100	4
205CP24	Web Technologies	30	70	100	4
206CP24	DBMS LAB	-	-	100	3
207CP24	Web Technologies LAB	-	-	100	3
<b>SECOND YEAR: Semester-3</b>					
301CP24	Object Oriented Modelling and Design using UML	30	70	100	4
302CP24	Cloud Computing	30	70	100	4
303CP24	Artificial Intelligence	30	70	100	4
304CP24	Cryptography & Network Security	30	70	100	4
305CP24	Programming and Problem Solving using Python	30	70	100	4
306CP24	Cryptography & Network Security LAB	-	-	100	3
307CP24	Python Programming LAB	-	-	100	3
<b>SECOND YEAR: Semester-4</b>					
401CP24	Data Mining and Big Data	30	70	100	4
402CP24	Machine Learning	30	70	100	4
403CP24	Mobile Computing with Android	30	70	100	4
404CP24	Project Work	-	-	200	10
-	Total Credits	-	-	-	100



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### MASTER OF COMPUTER SCIENCE (CS)

Programme Code: 109

### PROGRAMME SYLLABUS

### 1 YEAR M.Sc (COMPUTER SCIENCE)- I SEMESTER SYLLABUS

#### 101CP24: DATA STRUCTURES IN C

##### UNIT-I

**Arrays and Structures** - Arrays, Dynamically allocated arrays, Structures and Unions, polynomials. **Stacks and Queues** - Stacks, Stacks using Dynamic Arrays, Queues, Circular queues using dynamic arrays, Evaluation of expressions, multiple stacks and queues.

##### UNIT - II

**Linked List** - Single Linked List and chains, Representing chains in C, Linked stacks and queues, polynomials, Polynomial representation, Adding polynomials, Additional list operations, Operations on chains, Operations for Circularly linked lists, Sparse Matrices, Sparse Matrix representation, Doubly Linked lists.

##### UNIT - III

**Introduction** - Terminology, Representation of trees. **Binary Trees**- The abstract data type, Properties of binary trees, Binary tree representations. **Binary tree traversals** - Inorder traversal, Preorder traversal, Postorder traversal. **Threaded Binary trees** - Threads Inorder traversal of a threaded binary tree. **Binary Search Trees** - Definition, Searching a BST, Insertion into a BST, Deletion from a BST.

##### UNIT-IV

**Sorting** - Motivation, Insertion sort, Quick sort, Merge sort, Heap sort, External sorting. Hashing - Introduction, Static hashing, Hash tables, hash functions, Overflow handling

##### UNIT- V

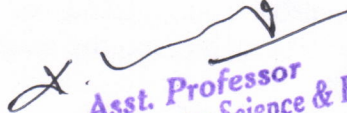
**Graphs** - The graph abstract data type, Introduction, definitions, graph representations. Elementary graph operations -Depth First Search, Breadth First Search, Connected Components, Spanning trees, Biconnected Components. Minimum cost Spanning trees - Kruskals Algorithm, Prims algorithm. Shortest paths - Single source problem, all pairs shortest path.

#### **Prescribed Book**

Horowitz, Sahani, Anderson - Freed, "Fundamentals of Data Structures in C" Chapters 2-8

#### **Reference Book**

1. D SAMANTA, "Classic Data Structures", -PHI
2. Balagurusamy, "C Programming and Data Structures", Third Edition, TMH (2008)

  
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## 102CP24: OBJECT ORIENTED PROGRAMMING WITH JAVA

### UNIT I

**Java Basics** - History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow-block scope, conditional statements, loops, break and continue statements, simple java program, arrays, input and output, formatting output, Review of OOP concepts, encapsulation, inheritance, polymorphism, classes, objects, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class, Enumerations, autoboxing and unboxing, Generics.

**Inheritance** -Inheritance concept, benefits of inheritance, Super classes and Sub classes, Member access rules, Inheritance hierarchies, super uses, preventing inheritance final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

### UNIT II

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface

**Packages**-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

### UNIT III

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.

**Exception handling** – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes, Guide lines for proper use of exceptions.

### UNIT IV

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

**Event Handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Semantic and Low-level events, Examples handling a button click, handling mouse and keyboard events, Adapter classes.

### UNIT V

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet - Four methods of an applet, Developing applets and testing, passing parameters to applets, applet security issues.

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**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame, JApplet, JWindow, JDialog, Light weight containers – JPanel, A simple swing application, Overview of several swing components- JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, Java's Graphics capabilities – Introduction, Graphics contexts and Graphics objects, color control, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout manager types – border, grid, flow, box.

#### **Prescribed Text Books**


1. Java the complete reference, 7<sup>th</sup> edition, Herbert Schildt, TMH.
2. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java How to Program P.J.Deitel and H.M.Deitel ,8<sup>th</sup> edition, PHI.

#### **Reference Text Books**

Core Java, Volume 1-Fundamentals, eighth edition, Cay S.Horstmann and Gary Cornell, Pearson education.

Thinking in Java, Bruce Eckel, PHP

Object Oriented Programming through Java, P.Radha Krishna, Universities Press.

  
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## 103CP24: OPERATING SYSTEMS

### UNIT-I

**Introduction** : What Operating Systems Do – Computer System Organization – Computer system Architecture – Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Special purpose Systems – Computing Environments.

**System Structure** : Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs – Operating System Design and Implementation – Operating System Structure – Virtual Machine – Operating System Generation – System Boot.

**Process Concept**: Overview – Process Scheduling – Operations on Processes – Inter process Communication – Examples of IPC Systems – Communication in Client Server Systems.

### UNIT-II

**Multithreaded Programming** : Overview – Multithreading Models – Thread Libraries – Threading Issues – Operating System Examples.

**Process Scheduling** : Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Thread Scheduling.

### UNIT-III

**Synchronization** : Background – The Critical Section Problem – Peterson's solution – Synchronization Hardware – Semaphores – Classic Problem of Synchronization – Monitors – Synchronization Examples – Atomic Transaction.

**Deadlocks** : System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

### UNIT-IV

**Memory Management Strategies** : Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation – Example The Intel Pentium.

**Virtual Memory Management** : Background – Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing.

### UNIT-V

**File System** : File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

**Implementing File Systems**: File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance – Recovery – Log structured File Systems.

**Secondary Storage Structure** : Overview of Mass Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management – RAID structure.

**I/O Systems** : Overview – I/O Hardware – Application I/O Interface – Kernel I/O Interface – Transforming I/O requests to Hardware Operations – Streams – Performance.

### **Prescribed Book**

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne. "Operating System Principles", Seventh Edition, Wiley.

**Chapters** 1.1 – 1.12, 2.1 – 2.10, 3.1 – 3.6, 4.1 – 4.5, 5.1 – 5.5, 6.1 – 6.9, 7.1 – 7.7, 8.1 – 8.7, 9.1 – 9.6, 10.1 – 10.6, 11.1 – 11.8, 12.1 – 12.7, 13.1 – 13.7

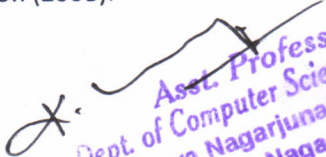
### **Reference Book**

1. William Stallings, "Operating Systems – Internals and Design Principles", Fifth Edition, 2. Pearson Education (2007)

3. Achyut S Godbole, "Operating Systems", Second Edition, TMH (2007).

4. Flynn/McHoes, "Operating Systems", Cengage Learning (2008).

5. Deitel & Deitel, "Operating Systems", Third Edition, Pearson Education (2008).

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## 104CP24: PROBABILITY AND STATISTICS

### Unit I:

**Some probability laws:** Axioms of Probability, Conditional Probability, Independence of the Multiplication Rule, Bayes' theorem

**Discrete Distributions:** Random Variables, Discrete Probability Densities, Expectation and distribution parameters, Binomial distribution, Poisson distribution, simulating a Discrete distribution

### Unit II:

**Continuous distributions:** continuous Densities, Expectation and distribution parameters, exponential distribution, Normal distribution, Weibull distribution and Reliability.

**Estimation:** Point estimation, interval estimation and central limit theorem.

### UNIT III:

**Inferences on the mean and the Variance of a distribution:** Hypothesis Testing, significance testing, Hypothesis and significance test on the mean, Hypothesis tests on the Variance

**Inferences on proportions:** estimating proportions, testing hypothesis on a proportion, Comparing two proportions: estimation, comparing two proportions: hypothesis testing.

### UNIT IV:

**Comparing two means and two variances:** point estimation: independent samples, Comparing variances: the F-distribution, Comparing means: variances equal,

**Analysis of Variance:** One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design

### UNIT V:

**Simple linear regression and correlation:** model and parameter estimation, inferences about slope, inferences about intercept, Co-efficient of determination


**Multiple linear regression models:** least square procedures for model fitting, a matrix approach to least squares, interval estimation.

### **Prescribed book:**

J Susan Milton and Jesse C. Arnold: "Introduction to Probability and Statistics", Fourth edition, TMH,(2007).

### **Reference book:**

William Mendenhall, Robert J Beaver, Barbara M Beaver: Introduction to Probability and Statistics, Twelfth edition, Thomson.

  
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## 105CP24: COMPUTER ORGANIZATION

### UNIT I

**Digital logic circuits**-Logic gates, Boolean algebra, Map simplification, Combinational logic, circuits, Flip flops, Sequential logic circuits.

**Digital Components** - Integrated circuits, Decoders, Multiplexers, Registers, Shift registers, Binary Counters, Memory unit.

**Data Representation** - Data types, Complements, Fixed & Floating point representation, Other binary codes, Error Detection codes

### UNIT II

#### **Register Transfer and micro operations**

Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic micro operations, Logical micro operations, shift micro operations, Arithmetic Logic shift unit.

**Basic Computer Organization and Design** - Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-output and Interrupt

### UNIT III

**Micro programmed Control** - control Memory, Address Sequencing, Micro program example, Design of control unit.

**Central Processing Unit** - General Register Organization, Stack Organization, Instruction format, Addressing modes, Data Transfer and Manipulation, Program Control.

### UNIT IV

**Computer Arithmetic** - Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

### UNIT V

**Input-Output Organization** - Peripheral Devices, Input Output Interface, asynchronous Data Transfer, Modes of Transfers, Priority Interrupt.

**Memory Organization** - Memory Hierarchy, Main memory, Auxiliary Memory, Associative memory, Cache memory.

#### **Prescribed Book**

Morris Mano, "Computer System Architecture", 3<sup>rd</sup> Edition, PHI.

#### **Reference Books**


1. V. Rajaraman, T. Radha Krishnan, "Computer Organization and Architecture", PHI
2. Behrooz Parhami, "Computer Architecture", Oxford (2007)
3. ISRD group, "Computer Organization", ace series, TMH (2007)
4. William Stallings, "Computer Organization and Architecture – Designing for Performance", Pearson Education (2005)

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## 106CP24: DATA STRUCTURES LAB Using C

### Lab cycle

1. Program for Sorting 'n' elements Using bubble sort technique.
2. Sort given elements using Selection Sort.
3. Sort given elements using Insertion Sort.
4. Sort given elements using Merge Sort.
5. Sort given elements using Quick Sort.
6. Implement the following operations on single linked list.  
(i) Creation (ii) Insertion (iii) Deletion (iv) Display
7. Implement the following operations on double linked list.  
(i) Creation (ii) Insertion (iii) Deletion (iv) Display
8. Implement the following operations on circular linked list.  
(i) Creation (ii) Insertion (iii) Deletion (iv) Display
9. Program for splitting given linked list.
10. Program for traversing the given linked list in reverse order.
11. Merge two given linked lists.
12. Create a linked list to store the names of colors.
13. Implement Stack Operations Using Arrays.
14. Implement Stack Operations Using Linked List.
15. Implement Queue Operations Using Arrays.
16. Implement Queue Operations Using Linked List.
17. Implement Operations on Circular Queue.
18. Construct and implement operations on Priority Queue.
19. Implement Operations on double ended Queue.
20. Converting infix expression to postfix expression by using stack.
21. Write program to evaluate post fix expression.
22. Implement Operations on two-way stack.
23. Add two polynomials using Linked List.
24. Multiply Two polynomials using Linked List.
25. Construct BST and implement traversing techniques recursively.
26. Implement preorder traversal on BST non recursively.
27. Implement in order traversal on BST non recursively.
28. Implement post order traversal on BST non recursively.
29. To Convert matrix into sparse matrix.
30. Implement binary search techniques recursively.
31. Program to implement graph traversing techniques DFS AND BFS.
32. Program to estimate shortest path for a graph.

  
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**107CP24: JAVA PROGRAMMING LAB**  
**Lab Cycle**

1. Write a Java Program to define a class, describe its constructor, overload the constructors and instantiate its object.
2. Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables and instantiate its object
3. Write a java program to practice using String class and its methods
4. Write a java program to implement inheritance and demonstrate use of method overriding
5. Write a java program to implement multilevel inheritance by applying various access controls to its data members and methods.
6. Write a program to demonstrate use of implementing interfaces
7. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
8. Write a Java program to implement the concept of importing classes from user defined package and creating packages
9. Write a program to implement the concept of threading by implementing Runnable Interface
10. write a java program to store and read objects from a file
11. Write a Java program that displays the number of characters, lines and words in a text file.
12. write a java program to illustrate object serialization
13. Create a java program to illustrate user defined exception
14. Write a java program to create a thread using runnable interface
15. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds
16. Write an applet To create multiple threads that correctly implements producer consumer problem using the concept of Inter thread communication
17. Write an applet To handling the mouse events
18. Write a Program That works as a simple calculator using Grid layout to arrange buttons for the digits and +, -, \* % operations. Add a text field to print the result.
19. Build and run "CelsiusConverter" sample application using swings
20. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked

  
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## **1 YEAR M.Sc (COMPUTER SCIENCE)- II SEMESTER SYLLABUS**

### **201CP24: DATABASE MANAG ENT SYSTEMS**

#### **UNIT-I**

**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.

#### **UNIT-II**

**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-III**


**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-IV**

**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.

  
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**Relational Database Design Algorithms and Further Dependencies** Properties of Relational Decompositions, Algorithms from Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies, Other Dependencies and Normal Forms.

### UNIT-V

**Document oriented data** principles of schema design, designing an e-commerce data model, Nuts and bolts on databases collections and documents.

**Queries and Aggregation**e-commerce's queries, MongoDB's query language, aggregating orders, aggregating in detail.

**Updates atomic operations and deletes** Document updates, e-commerce updates, atomic document processing, nuts and bolts Mongo DB updates and deletes.

#### **Prescribed Books**

Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education (2007)

**Chapters**1.1 to 1.6, 2, 3.1 to 3.6, 4.1 to 4.5, 5, 6, 8, 10, 11

MongoDB in Action, Kyle Banker, Manning Publication and Co.**Chapters**4,5 and 6

#### **Reference Books**

1 C.J. Date, A.Kannan, S. Swamynathan, "An Introduction to Database Systems", VII Edition Pearson Education (2006).

2. Database system concepts, Silberschatz, Korth, Sudarshan, Mc-graw-hill, 5<sup>th</sup> edition.

3. MongoDBLearn MongoDB in a simple Way, Dan Warnock

  
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## **202CP24: Design & Analysis of Algorithms**

### **UNIT I**

Introduction to Computer Algorithms- Algorithm Specification, Performance Analysis, Randomized algorithms

Elementary Data Structures- Stacks and Queues, Tree, Dictionaries, Priority Queues, Sets and Disjoint Set Union, graphs

**Learning Outcomes**

### **UNIT - II**

Divide - And – Conquer - General Method, Binary Search, Maximum and Minimum, Merge Sort, Quick Sort, Selection, Strassen's Matrix Multiplication, Convex Hull.

### **UNIT-III**

The Greedy Method - Knapsack Problem, Tree vertex splitting, Job sequencing, with deadlines, Minimum-cost spanning trees, Optimal storage on tapes, Optimal merge pattern, Single source shortest paths.

### **UNIT-IV**

Dynamic Programming - General method, Multistage graph, All pairs shortest path, Single-source shortest path, Optimal Binary search trees, String Editing, 0/1 Knapsack, Reliability design, The traveling salesman problem, Flow shop scheduling.

Basic Traversal and Search Techniques - Basic traversal & search techniques - Techniques for binary trees, techniques for graphs, connected components & spanning trees, Bi-connected components & DFS.

### **UNIT-V**

Backtracking - Back tracking - The General Method, The 8-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycle, Knapsack problem.


Branch and Bound - The method, 0/1 Knapsack problem, Traveling salesperson, Efficiency considerations.

### **Prescribed Book**

L Ellis Horwitz, Sartaj Sahani, 'Fundamentals of Computer Algorithms', Universities Press, The following topics in the prescribed book Topics 1,2,3,4,5,6,7,8

### **Reference Books**

1. Bases S. & Gelder A.V - computer Algorithms, Addison Wesley(200)
2. Cormen TH et al - Introduction to Algorithms, PHI(2001)
3. Brassard & Bralley - Fundamentals of Algorithms, PHI(2001)

  
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## 203CP24: SOFTWARE ENGINEERING

### **Unit-I:**

**Introduction to Software Engineering:** The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software: The Quality of legacy software, Software Evolution, Software Myths.

**Process Models:** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, The Waterfall Model, Incremental Process Models: The Incremental Model, The RAD Model, Evolutionary Process Model: Prototyping, The Spiral Model, The Concurrent Development Model, Specialized Process Models: Component Based Development, The formal Methods Model, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process. **An Agile View of Process:** What is Agility? What is Agile Process? Agile Process Models: Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method, Scrum, Crystal, Feature Driven Development, Agile Modeling.

### **Unit-II**

**Metrics for Process and Projects:** Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Integrating Metrics within Software Process, Metrics for Small Organizations, Establishing a Software Metrics Program.

**Project Management:** The Management Spectrum, the People, The Product, The Process, The Project, The W5HH Principles.

### **Unit-III**

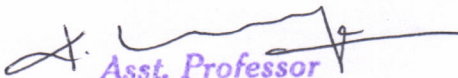
**Requirement Engineering:** Requirement Modeling Strategies, Flow Oriented Modeling, Creating a Behavioural Model, Patterns for Requirement Modeling, Requirement Modeling for Webapps.

**Building the Analysis Model:** Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Object Oriented Analysis, Scenario Based Modeling, Flow Oriented Modeling, Class Based Modeling, Creating a Behavioral Model.

**Design Engineering:** Design within the context of Software Engineering, Design Process and Design Quality, Design Concepts, The Design Model, Pattern Based Software Design.

### **Unit-IV**

**Creating an Architectural Design:** Software architecture, Data design, Architectural styles and patterns, Architectural Design.

  
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**Performing User interface Design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

### **Unit-V**

**Testing Strategies:** A strategic Approach to Software Testing, Strategic Issues, and Test Strategies for conventional Software, Testing Strategies for Object Oriented Software, Validation Testing, System Testing, the Art of Debugging.


**Testing Tactics:** Software Testing Fundamentals, Black Box and White Box Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing, Object Oriented Testing Methods, Testing Methods Applicable at the class level, InterClass Test Case Design, Testing for Specialized Environments, Architectures and Applications, Testing Patterns.

### **Prescribed Book:**

Roger S Pressman, "Software Engineering—A Practitioner's Approach", Sixth Edition, TMH International.

### **Reference Books:**

1. Sommerville, "Software Engineering", Seventh Edition Pearson Education (2007)
2. S.A.Kelkar, "Software Engineering – A Concise Study", PHI.
3. Waman S.Jawadekar, "Software Engineering", TMH.
4. Ali Behforooz and Frederick J.Hudson, "Software Engineering Fundamentals", Oxford (2008).

  
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## 204CP24: COMPUTER NETWORKS

### UNIT – I

**Introduction:** Uses of Computer Networks - Business Applications, Home Applications, Mobile Users, Social Issues. Network Hardware - Local Area Networks – Metropolitan Area Networks – Wide Area Networks – Wireless Networks – Home Networks – Internetworks. Network Software - Protocol Hierarchies – Design Issues for the Layers – Connection Oriented and Connectionless Services – Service Primitives – The relationship of Services to Protocols. Reference Models - The OSI Reference Model – The TCP/IP Reference Model – A Comparison of OSI and TCP/IP reference Model – A Critique of the OSI Model and Protocols – A Critique of the TCP/IP reference model. Example Networks - The Internet – Connection Oriented Networks x.25, Frame Relay, and ATM – Ethernet – Wireless LANs Network Standardization - Who's who in the Telecommunication World – Who's who in the International Standards World – Who's who in the Internet Standards World.

**Physical Layer:** Guided Transmission Media - Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics

**Data Link Layer:** Data Link Layer Design Issues - Services Provided to the Network Layer – Framing – Error Control – Flow Control. Error Detection and Correction - Error correcting Codes – Error Detecting Codes. Elementary Data Link Protocols - An unrestricted Simplex Protocol – A simplex Stop-and-wait Protocol – A simplex Protocol for a Noisy channel. Sliding Window Protocols - A one-bit sliding Window Protocol – A Protocol using Go Back N – A Protocol using selective Repeat. Example Data Link Protocols - HDLC – The Data Link Layer in the Internet.

### UNIT – II

**The Medium Access Control Sublayer:** Ethernet - Ethernet Cabling – Manchester Encoding – The Ethernet MAC sublayer Protocol – The Binary Exponential Backoff Algorithm – Ethernet Performance – Switched Ethernet – Fast Ethernet – Gigabit Ethernet – IEEE 802.2 Logical Link Control – Retrospective on Ethernet. WIRELESS LANS- The 802.11 Protocol Stack - The 802.11 Physical Layer - The 802.11 MAC sublayer Protocol - The 802.11 Frame Structure. BLUETOOTH - Bluetooth Architecture – Bluetooth Applications – The Bluetooth Protocol Stack – The Bluetooth Radio Layer – The Bluetooth Baseband Layer – The Bluetooth L2CAP layer – The Bluetooth Frame Structure. Data Link Layer Switching - Bridges from 802.x to 802.y – Local Internetworking – Spanning Tree Bridges – Remote Bridges – Repeaters, Hubs, Bridges, Switches, Routers and Gateways – Virtual LANs.

### UNIT – III

**The Network Layer:** Network Layer Design Issues - Store-and- Forward Packet Switching – Services Provided to the Transport Layer – Implementation of Connectionless Services – Implementation of Connection Oriented Services – Comparison Of Virtual Circuit and Datagram subnets. Routing Algorithms - The Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing –

  
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Multicast Routing – Routing for Mobile Hosts. Internet Working - How Networks Differ – How Networks can be connected – Concatenated Virtual Circuits – Connectionless Internetworking – Tunneling – Internet work Routing – Fragmentation. The Network Layer in the Internet - The IP Protocol – IP address – Internet Control Protocols – OSPF – The Internet Gateway Routing Protocol – BGP – The Exterior Gateway Routing Protocol.

#### **UNIT – IV**

**The Transport Layer:** The Transport Service - Services provided to the Upper Layers – Transport Services Primitives – Berkeley Sockets. Elements of Transport Protocols - Addressing – Connection Establishment – Connection Release – Flow Control and Buffering – Multiplexing – Crash Recovery. The Internet Transport Protocols : UDP - Introduction to UDP – Remote Procedure Call – The Real Time Transport Protocol. The Internet Transport Protocols : TCP - Introduction to TCP – The TCP Service Model – the TCP Protocol – The TCP segment header – TCP connection establishment – TCP connection release – Modeling TCP connection management- TCP Transmission Policy – TCP congestion Control – TCP Timer Management – Wireless TCP and UDP – Transactional TCP.

#### **UNIT – V**

**The Application Layer:** The Domain Name System - The DNS Name Space – Resource Records – Name Servers. Electronic Mail - Architecture and Services – The User Agent – Message Formats – Message Transfer – Final Delivery. The World Wide Web - Architecture Overview – Static Web Documents – Dynamic Web Documents – HTTP – The Hyper Text Transfer Protocol – Performance Enhancements – The Wireless Web. Multimedia - Introduction to Digital Audio – Audio Compression – Streaming Audio – Internet Radio – Voice Over IP – Introduction to Video – Video Compression – Video on Demand.

#### **Prescribed Book**

Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, PHI.

**Chapters** 1.1 to 1.6, 2.2, 3.1 to 3.4, 3.6, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2.1 to 5.2.9, 5.5, 5.6.1 to 5.6.5, 6.1.1 to 6.1.3, 6.2, 6.4, 6.5, 7.1 to 7.4

#### **Reference Books**

1. James F.Kurose, Keith W.Ross, “Computer Networking”, Third Edition, Pearson Education
2. Behrouz A Forouzan, “Data Communications and Networking”, Fourth Edition, TMH (2007)
3. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, Cengage Learning (2008)

  
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## 205CP24: WEB TECHNOLOGIES

### UNIT I

**HTML common Tags**List, Tables, images, forms, Frames, Cascading Style Sheets; **Java Script**Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

### UNIT II

**XML**-Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML ProcessorsDOM and SAX

**CGI Scripting**- What is CGI? – Developing CGI applications – Processing CGI – Returning a Basic HTML page – Introduction to CGI.pm – CGI.pm methods – Creating HTML pages dynamically.

### UNIT III

**JDBC** Introduction to JDBC – Connections – Internal Database Connections – Statements – Results Sets - Prepared Statements - Callable Statements.

**Network Programming and RMI**why networked Java – Basic Network Concepts – looking up Internet Addresses – URLs and URIs – UDP Datagram's and Sockets – Remote Method Invocation.

### UNIT -IV

**Web Servers, Tomcat** web server, Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat, Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

#### **Servlets**

Introduction to ServletsLifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

### UNIT-V

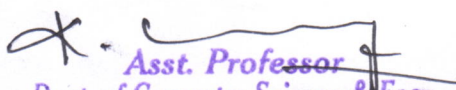
**Introduction to JSP** The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment

#### **Prescribed Textbooks**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, WILEY Dreamtech (units I, II)
2. Java Programming with JDBC ;Donald Bales, O'Reilly (Unit III)
3. Java Network Programming, elliotte Rusty Harold, 3rd Edition, O'Reilly (Unit III)
4. Java Server Pages – Hans Bergsten, SPD O'Reilly (Unit IV)

#### **Reference Textbooks**

1. Robert W. Sebesta, "Programming the World Wide Web", Third Edition, Pearson Education (2007).
2. Anders Moller and Michael schwartzbach, "An Introduction to XML and Web Technologies", Addison Wesley (2006)
3. Jeffrey C. Jackson, "Web Technologies – A Computer Science Perspective", Pearson Education (2008).
4. H.M.Deitel, P.J.Deitel, "Java How to Program", Sixth Edition, Pearson Education (2007).

  
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**206CP24: DBMS LAB**  
**LAB Cycle – I**

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

**Table Name:** Client\_Master

**Description:** This table stores the information about the clients.

Column Name	Data Type	Size	Attribute
Client_no	Varchar2	6	Primary Key and first letter should starts with 'C'
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Bal_due	Number	10,2	

**Table Name:** Product\_master

**Description:** This table stores the information about products.

Column Name	Data Type	Size	Attribute
Product_no	Varchar2	6	Primary Key and first letter should starts with 'P'
Description	Varchar2	10	Not null
Profit_percent	Number	2,2	Not null
Unit_measure	Varchar2	10	
Qty_on_hand	Number	8	
Record_lvl	Number	8	
Sell_price	Number	8,2	Not null, can't be 0
Cost_price	Number	8,2	Not null, can't be 0

**Table Name:** salesman\_master

**Description:** This table stores the salesmen working in the company

Column Name	Data Type	Size	Attribute
Salesman_id	Varchar2	6	Primary Key and first letter should starts with 'S'
Name	Varchar2	10	Not null
Address1	Varchar2	10	
Address2	Varchar2	10	
City	Varchar2	10	
State	Varchar2	10	
Pincode	Number	6	Not null
Sal amt	Number	8,2	Should not null and zero
Target amt	Number	6,2	Should not null and zero
Remarks	Varchar2	10	

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**Table Name: sales\_order**

**Description: This table stores the information about orders**

Column Name	Data Type	Size	Attribute
S_order_no	Varchar2	6	Primary Key and first char is 'O'
S_order_date	Date		
Client_no	Varchar2	6	Foreign key
Delve_address	Varchar2	20	
Salesman_no	Varchar2	6	Foreign key
Delve_type	Varchar2	1	Delivery part(P)/Full(F) and default 'F'
Billed_yn	Char	1	
Delve_date	Date		Can't be less than the s_order_date
Order_status	Varchar2	10	Values in 'IN PROCESS', 'FULFILLED', 'BACK ORDER', 'CANCELLED'

**Table Name: sales\_order\_details**

**Description: This table stores the information about products ordered**

Column Name	Data Type	Size	Attribute
S_order_no	Varchar2	6	Primary key, foreign key references sales_order table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_ordered	Number	8	
Qty_disp	Number	8	
Product_rate	Number	10,2	

**Table Name: challan\_master**


**Description: This table stores the information about challans made for orders.**

Column Name	Data Type	Size	Attribute
Challan_no	Varchar2	6	Primary key, first two letters must start with 'CH'
S_order_no	Varchar2	6	Foreign key references sales_order
Challan_date	Date		
Billed_yn	Char	1	Values in 'Y', 'N' default 'N'

**Table Name: Challan\_Details**

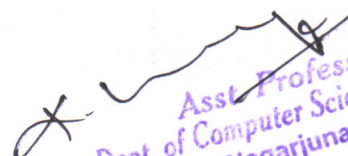
**Description: This table stores the information about challan details.**

Column Name	Data Type	Size	Attribute
Challan_no	Varchar2	6	Primary key, foreign key references challan_master table
Product_no	Varchar2	6	Primary key, foreign key references product_master table
Qty_disp	Number	4,2	Not null

  
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**Solve the following queries by using above tables.**

1. Retrieve the list of names and cities of all the clients.
2. List the various products available from product\_master.
3. Find out the clients who stay in a city whose second letter is 'a'.
4. Find the list of all clients who stay in the city 'CHENNAI' or 'DELHI'.
5. List all the clients located at 'CHENNAI'.
6. Print the information from sales order as the order the places in the month of January.
7. Find the products with description as 'Floppy Drive' and 'Pen drive'.
8. Find the products whose selling price is grater than 2000 and less than or equal to 5000.
9. Find the products whose selling price is more than 1500 and also find the new selling price as original selling price \*15.
10. Find the products in the sorted order of their description.
11. Divide the cost of product '540 HDD' by difference between its price and 100.
12. List the product number, description, sell price of products whose description begin with letter 'M'.
13. List all the orders that were cancelled in the month of March.
14. Count the total number of orders.
15. Calculate the average price of all the products.
16. Determine the maximum and minimum product prices.
17. Count the number of products having price grater than or equal to 1500.
18. Find all the products whose quantity on hand is less than reorder level.
19. Find out the challan details whose quantity dispatch is high.
20. Find out the order status of the sales order, whose order delivery is maximum in the month of March.
21. Find out the total sales made by the each salesman.
22. Find the total revenue gained by the each product sales in the period of Q1 and Q2 of year 2006.
23. Print the description and total qty sold for each product.
24. Find the value of each product sold.
25. Calculate the average qty sold for each client that has a maximum order value of 1,50,000.
26. List the products which has highest sales.
27. Find out the products and their quantities that will have to deliver in the current month.
28. Find the product number and descriptions of moving products.
29. Find the names of clients who have purchased 'CD DRIVE'.
30. List the product numbers and sales order numbers of customers having quantity ordered less than 5 from the order details for the product '1.44 Floppies'.
31. Find the product numbers and descriptions of non-moving products.
32. Find the customer names and address for the clients, who placed the order '019001'.
33. Find the client names who have placed orders before the month of May, 2006.
34. Find the names of clients who have placed orders worth of 10000 or more.
35. Find out if the product is '1.44 drive' is ordered by any client and print the client number, name to whom it is sold.

  
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## 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**

S(SNO,SNAME,CITY,STATUS)

P(PNO,PNAME,COLOR,WEIGHT,CITY,COST)

SP(SNO,PNO,QTY)

J(JNO,JNAME,CITY)

SPJ(SNO,PNO,JNO,QTY)

1. Get Suppliers Names for Suppliers who supply at least one red part.
2. Get Suppliers Names for Suppliers who do not supply part 'P2'
3. Using Group by with Having Clause, Get the part numbers for all the parts supplied by more than one supplier.
4. Get supplier numbers for suppliers with status value less the current max status value.
5. Get the total quantity of the part 'P2' supplied.
6. Get the part color, supplied by the supplier 'S1'
7. Get the names of the parts supplied by the supplier 'Smith' and "Black"
8. Get the Project numbers, whose parts are not in Red Color, from London.
9. Get the suppliers located from the same city.
10. Get the suppliers, who does not supply any part.
11. Find the pnames of parts supplied by London Supplier and by
12. no one else.
13. Find the sno's of suppliers who charge more for some part than the average cost of that part.
14. Find the sid's of suppliers who supply only red parts.
15. Find the sid's of suppliers who supply a red and a green part.
16. Find the sid's of suppliers who supply a red or green part.

  
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### Cycle III

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

Flights (fno 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. For each pilot who is certified for more than three aircraft, find the eid's and the maximum cruising range of the aircraft that he (or She) certified for.
2. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
3. Find the name of the pilots certified from some Boeing aircraft.
4. For all aircraft with cruising range over 1,000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
5. Find the aid's of all aircraft than can be used from Los Angels to Chicago.
6. Print the enames of pilots who can operate planes with cruising range greater than 3,000 miles, but are not certified by Boeing aircraft.
7. Find the total amount paid to employees as salaries.
8. Find the eid's of employees who are certified for exactly three aircrafts.
9. Find the eid's of employee who make second highest salary.
10. Find the aid's of all than can be used on non-stop flights from Bonn to Chennai.

### Cycle IV


#### Employee Database

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

**DEPT (DEPTNO, DNAME, LOC)**

**EMP (EMPNO, ENAME, JOB, MGR, HIREDATE, SAL, COMM, DEPTNO)**

1. Create a view, which contain employee names and their manager names working in sales department.
2. Determine the names of employee, who earn more than there managers.
3. Determine the names of employees, who take highest salary in their departments.
4. Determine the employees, who located at the same place.
5. Determine the employees, whose total salary is like the minimum salary of any department.
6. Update the employee salary by 25%, whose experience is greater than 10 years.
7. Delete the employees, who completed 32 years of service.
8. Determine the minimum salary of an employee and his details, who join on the same date.
9. Determine the count of employees, who are taking commission and not taking commission.


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10. Determine the department does not contain any employees.
11. Find out the details of top 5 earners of company. (Note  
Employee Salaries should not be duplicate like 5k,4k,4k,3k,2k)
12. Display those managers name whose salary is more than an average salary of his employees.
13. Display the names of the managers who is having maximum number of employees working under him?
14. In which year did most people join the company? Display the year and number of employees.
15. Display ename, dname even if there no employees working in a particular department(use outer join).

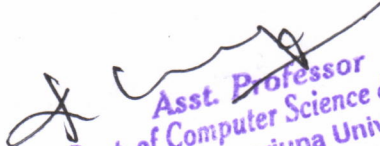
## MongoDB

1. Create students and teacher objects in MongoDB. The teacher object must consist of students enrolled.
  - List all the teachers
  - Display the information of the teacher based on id
  - Updates the teachers name for id value 2
  - Delete data with id =2 from student
  - List all the students assigned to a teacher
  - List all the teacher without students
  - List teachers of a student.
2. Create a login template to check whether the user is a valid user
3. Repeat the above cycle III & IV with MongoDB

  
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## 207CP24: WEB TECHNOLOGIES LAB

1. Develop and demonstrate a HTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the <span> tag.
2. Write HTML code to provide intra document linking.
3. Create a form with the following specifications
  - a) Our form uses frames, one to hold the links bar at the top of the browser window.
  - b) Other is a larger frame that provides the main view.
  - c) The links bar should contain 5 links, which when clicked, should display the appropriate HTML file in the larger frame.
4. to create a webpage with the following using html
  - a. to embed an image in web page
  - b. to fix the hot spots
  - c. show all the related information when a hot spot is clicked in the map
5. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluâtes the expression and Displays the result.
6. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
7. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)
8. Write a JavaScript code to find factorial of N. (Use recursive function)
9. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
10. Create a web page using two image files, which switch between one another as the mouse pointer moves over the images. Use the onMouseOver and onMouseOut event handlers.
11. Design an XML document to store information about a student in an engineering college affiliated to ANU. The information must include college id, Name of the College, Brach, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.
12. Create an XML document, which contains 10 users information. Implement a program, which takes User Id as an input and returns the user details by taking the user information from the XML document
13. write a program for implementing student information using XML
14. write a java program to illustrate java to database connectivity using JDBC
15. Write a program to print the Fibonacci numbers using RMI.
16. Write a program using RMI to access the database using the primary key value and return the data to the client.
17. Write a html program for invoking servlet from applet
18. write a java servlet program to conduct online examination and to display student mark list available in a database
19. Create a java program to create an airline reservation service and a travel agent and the travel agent is searching for an airline using web services and database.
20. Write a JSP program to calculate income tax, login and data capture.

  
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## 2 YEAR M.Sc (COMPUTER SCIENCE)- III SEMESTER SYLLABUS

### 301CP24: Object Oriented Modelling and Design using UML

#### UNIT-I

Introduction: what is Object Orientation, What is OO Development, OO Themes, Evidence for Usefulness of OO Development.

Modeling as Design Technique: Modeling, Abstraction, Three Models

**Class Modeling:** Object and Class Concepts, Link and Association concepts, Generalization and Inheritance, A Sample Class Model.

**Advanced Class Modeling:** Advanced Object and Class Concepts, Association Ends, N-Ary Association, Aggregation, abstract Classes, Multiple Inheritance, Metadata, Reification, Constraints, Derived data, Packages.

#### UNIT-II

**State Modeling:** Events, States, Transitions and Conditions, state diagrams, state diagram behavior.

**Advanced State Modeling:** Nested State Diagrams, Nested states, signal generalization, concurrency, A Sample State Model.

**Interaction Modeling:** Use Case Models, Sequence Models, Activity Models.

**Advanced Interaction Modeling:** Use Case Relationships, Procedural Sequence Models, Special Constructs for Activity Models.

#### UNIT-III

**Process Overview:** Development Stages, Development Life Cycle.

**System Conception:** Devising a system Concept, Elaborating a Concept, Preparing a Problem Statement.

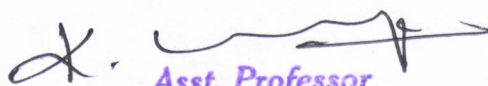
**Domain Analysis:** Overview of analysis, Domain Class Model, Domain State model, Domain Interaction Model, Iterating the Analysis.

**Application Analysis:** Application Interaction Model, Application Class Model, Application State Model, Adding Operations.

#### UNIT-IV

**System Design:** Overview of system Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystem, Identifying Concurrency, Allocation of Subsystems, Management of data storage, Handling Global Resources, Choosing a Software Control Strategy, Handling Boundary Conditions, Setting Trade-off priorities, Common Architecture of ATM System.

**Class Design:** Overview of Class Design, Bridging the Gap, Realizing Use Cases, Designing Algorithms, Recursing Downward, Refactoring, Design Optimization, Reification of Behavior, Adjustment of Inheritance, Organizing a class design.

  
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## UNIT-V

**Implementation Modeling:** Overview of Implementation, Fine Tuning classes, fine tuning Generalization, Realizing Associations, Testing.

**Programming Style:** Object-Oriented Style, Reusability, Extensibility, Robustness, Programming-in the Large.

### **Prescribed Book**

Michael R Blaha, James R Rumbaugh, "Object-Oriented Modeling and Design with UML", Second Edition, PHI.

**Chapters** 1.1 to 1.4, 2, 3.1 to 3.4, 4, 5, 6.1 to 6.5, 7, 8, 10, 11, 12, 13, 14, 15, 17, 20

### **Reference Books**

1. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", Pearson Education (2008).
2. Hans-Erik Eriksson, "UMLZ Took Kit", Wiley (2008).
3. Pascal Roques, "Modeling Software Systems Using UML2", Wiley (2008).
4. Simon Benett, Steve Mc Robb, "Object Oriented Systems Analysis and Design using UML", Second Edition, TMH (2007).
5. Mark Priestley, "Practical Object Oriented Design with UML", Second Edition, TMH (2008).
6. Grady Booch, James Rumbaugh "The Unified Modeling Language User Guide", Pearson (2008).

  
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## 302CP24: CLOUD COMPUTING

### UNIT-I

**Introduction** Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies.

**Principles of Parallel and Distributed Computing** Eras of Computing, Parallel Vs Distributed computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing.

### UNIT-II

**Virtualization** Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

**Cloud Computing Architecture** Introduction, Cloud reference model, Types of clouds, Economics of the cloud, open challenges.

### UNIT-III

**Aneka Cloud Application Platform** Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management.

**Concurrent Computing Thread Programming** Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.

### UNIT-IV

**High- Throughput Computing Task Programming** Task Computing, Task-based Application Models, Aneka Task-Based Programming.

**Data Intensive Computing Map-Reduce Programming** What is Data-Intensive Computing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

### UNIT-V

**Cloud Platforms in Industry** Amazon Web Services, Google AppEngine, Microsoft Azure, Observations.

**Cloud Applications** Scientific Applications, Business and Consumer Applications.

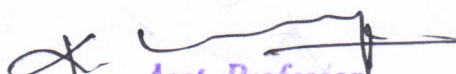
**Advanced Topics in Cloud Computing** Energy Efficiency in Clouds, Market Based Management of Clouds , Federated Clouds/ InterCloud, Third Party Cloud Services.

#### **Prescribed Book**

Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, "Mastering Cloud Computing", Mc Graw Hill Education.

#### **REFERENCES**

1. Michael Miller, "Cloud Computing", Pearson Education, New
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.
3. Cloud Application Architectures, George Reese, ISBN 8184047142, Shroff/O' Reilly, 2009.

  
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## 303CP24: ARTIFICIAL INTELLIGENCE

### UNIT I

What is Artificial Intelligence, Technique, Defining problem as a state space search, production systems, problem characteristics, production system characteristics. Heuristic search techniques Generation and test - Hill climbing - Best-first search - problem reduction - constraint satisfaction - means-ends analysis.

### UNIT II

Knowledge Representation Issues, using predicate logic, resolution, forward versus backward reasoning, matching, control knowledge. Symbolic reasoning under uncertainty

### UNIT III

Introduction to nonmonotonic reasoning, augmenting a problem solver, implementation of depth first search and breadth first search. Weak slot-and-filler structures, semantic nets, frames.

### UNIT IV

strong slot-and-filler structures  
conceptual dependency, scripts.  
Natural Language Processing  
syntactic processing, augmented transition networks, semantic analysis, case grammars.

### UNIT V

Common sense Qualitative physics, commonsense ontologies, memory organization, case based reasoning.

Expert systems - representing using domain knowledge-expert system shell.

### **Prescribed Book**

Rich E & Knight k Artificial Intelligence TMH(1991)

### **Reference Book**

Winston P.H Artificial Intelligence, Addison Wesley (1993)

Russell & Norvig Artificial Intelligence A Modern approach, Pearson education Asia

Donald A. Waterman A guide to expert systems, Pearson Education India.

  
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## **304CP24: CRYPTOGRAPHY AND NETWORK SECURITY**

### **UNIT I**

**Introduction** - security Trends, OSI security Architecture ,security attacks, security services, security mechanisms, A model for network security

**Conventional Encryption Classical Techniques** - Symmetric cipher model ,substitution techniques ,transposition techniques, rotor machines ,steganography

**Conventional Encryption Modern Techniques** -Block cipher principles, DES, strength of DES, Differential and linear cryptanalysis ,Block cipher design principles

### **UNIT II**

**Confidentiality using Symmetric encryption** - Placement of encryption function, traffic confidentiality, key distribution, random number generation

**Public - key cryptography & RSA** - Principles of Public key crypto systems ,RSA algorithm ,Key management ,Diffie Hellman key exchange ,elliptic curve cryptography

### **UNIT III**

**Message authentication and Hash functions** - Authentication requirements , Authentication functions, Message Authentication codes, Hash functions, Security of MAC's and hash functions

**Digital signatures and Authentication Protocols** - Digital signatures , Authentication Protocols, DSS

### **UNIT IV**

**Electronic Mail Security** - PGP, S/MIME

**IP Security** - IP Security Overview, IP Security architecture, Authentication header, encapsulating security payload, combining security associations, key management.

### **UNIT V**

**Fire Walls** - Firewall design principles ,trusted systems

### **Prescribed Book**


William Stallings Cryptography & Network Security Principles and Practices 4<sup>th</sup> Edition  
Pearson Education

Chapters 1,2,3,7,8,9,10,11,13,15,16,20

### **Reference Books**

Bruce Schneier - Applied Cryptography - Wiley - second edition

Davies & Price Security for computer Networks, Wiley (1984)

  
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## 305CP24: PROGRAMMING AND PROBLEM SOLVING USING PYTHON

### UNIT I

**Introduction** The Process of Computational Problem Solving, Python Programming Language, Python Data Types Expressions, Variables and Assignments, Strings, List, Objects and Classes, Python Standard Library, Imperative Programming Python programs, Execution Control Structures, User-Defined Functions, Python Variables and Assignments, Parameter Passing. –

### UNIT II

**Text Files** Strings, Formatted Output, Files, Errors and Exception Handling, Execution and Control Structures if Statement, for Loop, Two Dimensional Lists, while Loop, More Loop Patterns, Additional Iteration Control Statements, Containers and Randomness Dictionaries, Other Built-in Container Types, Character Encoding and Strings, Module random, Set Data Type.

### UNIT III

Namespaces Encapsulation in Functions, Global versus Local Namespaces, Exception Control Flow, Modules and Namespaces. Object Oriented Programming Fundamental Concepts, Defining a New Python Class, User-Defined Classes, Designing New Container Classes, Overloaded Operators, Inheritance, User-Defined Exceptions.

### UNIT IV

Graphical User Interfaces Basics of tkinter GUI development, event-based tkinter widgets, designing GUIs, OOP for GUIs, Recursion Introduction to Recursion, Examples of Recursion, Run Time Analysis, Searching, Iteration Vs Recursion, Recursive Problem Solving, Functional Language Approach.

### UNIT V


**Numerical Computing in Python** NumPy, Basics of turtle graphics, The Web and Search The World Wide Web, Python WWW API, String Pattern Matching, Database Programming in Python

### **TEXT BOOK**

Ljubomir Perkovic, "Introduction to Computing Using Python An Application Development Focus", Wiley, 2012.

### **REFERENCES**


Charles Dierbach, "Introduction to Computer Science Using Python A Computational Problem-Solving Focus", Wiley, 2013.

  
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### 306CP24: CRYPTOGRAPHY AND NETWORK SECURITY LAB

1. Write a Java program to perform encryption and decryption using the following algorithms:
  - a) Ceaser Cipher
  - b) Substitution Cipher
  - c) Hill Cipher
2. Write a Java program to implement the DES algorithm logic.
3. Write a Java program to implement RSA Algorithm.
4. Write a C/JAVA program to implement the Blowfish algorithm logic.
5. Write a C/JAVA program to implement the Rijndael algorithm logic.
6. Using Java Cryptography, encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
7. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
8. Write a program to implement digital signature.
9. Compute common secret key between client and server using Diffie-Hellman key exchange technique. Perform encryption and decryption of message using the shared secret key (Use simple XOR operation to encrypt and decrypt the message).
10. Implement DSS algorithm for signing and verification of messages between two parties (obtain  $H(M)$  using simple XOR method of hash computation on  $M$ ).

  
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## 307CP24: PYTHON PROGRAMMING LAB

### Lab Cycle

#### Simple Programs

1. Write a program using print Pascal triangle.
2. Write a program to find out the roots of the quadratic equations.
3. Write a program to display the Fibonacci series using generators.
4. Write a program to check the given number is palindrome or not.
5. Write a program to find the sum of digits of a given number
6. Write a Python program to calculate  $X = \frac{1}{2!} + \frac{2}{4!} + \frac{4}{8!} + \frac{8}{16!}$
7. Write a Python program to remove the punctuations from a string.
8. Write a Python program to implement the simple calculator.
9. Write a Python program to print the lower and upper triangles of a matrix.
10. Write a Python program to merge two mails.

#### Functions

1. Write a recursive Python function that has a parameter representing a list of integers and returns the maximum stored in the list.
2. Write a recursive Python function to that generates the top 20 even prime numbers in the range 1 to 1000.
3. Write a python function to calculate the multiplication of two matrices.
4. Write a Python function to reverse the given string.
5. Write a Python function that takes an integer n and a character c, returns a string and displays as "xxxxx" ( Ex the length of the retuned string is 5, then the output as XXXXX)
6. Write Python function that the search the given number in the list of numbers by using binary search.
7. Write a Python function to convert the given decimal number into binary number by using recursion.
8. Write a Python function to sort the list of records in a file.

#### GUI Programs

1. Construct a GUI application to generate the employee pay slip
2. Construct a GUI application to generate a Bar Graph for a excel data
3. Construct a GUI application to perform the Arithmetic operations
  - Read Input Values through input window
  - Choose choice and Operation through following windows

Choice
Intege
r
Arithmetic
Real

Operations
ddition
ubtractio

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**2 YEAR M.Sc (COMPUTER SCIENCE)- IV SEMESTER SYLLABUS**  
**401CP24: Data Mining and Big Data**

**UNIT – I**

**Data Warehouse:** An Overview , What is Data Warehouse? Data warehouse Architecture - From Data Warehousing to Data Mining

**OLAP Technology:** A Multidimensional Data Model-Online Analytical Processing, OLAP Operations, ROLAP, HOLAP, MOLAP.

**UNIT – II**

**Data mining** – Introduction, Data mining on what kind of data, Data mining functionalities, classification of Data mining systems, Major issues in Data mining.

**Mining Association rules in large databases** - Association rule mining, Mining single-Dimensional Boolean association rules from Transactional databases, Mining multi-Dimensional Association rules from relational Databases and Data Warehouses.

**UNIT – III**

**Classification and Prediction** - Introduction classification by decision tree induction, Bayesian Classification. Other classification methods, classification by back propagation, Prediction, classifier accuracy

**UNIT – IV**

**Cluster analysis** – Introduction types of data in cluster analysis a categorization of major clustering methods partitioning methods, hierarchical methods, Density based methods, DBSCAN, Grid-based method STRING , Model based clustering method Statistical Approach, outlier analysis.


**UNIT – V**

**Big Data** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications.

**Hadoop** Hadoop Architecture, Hadoop Storage HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., Hadoop MapReduce paradigm. Writing Hadoop MapReduce Programs

**Prescribed TextBooks**

1. Jiawei Han Micheline Kamber, “Data mining & Techniques”, Morgan Kaufmann publishers
2. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN 9788126551071, 2015.
3. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
4. Tom White, “HADOOP The definitive Guide” , O Reilly 2012.

  
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## 402CP24: MACHINE LEARNING

### UNIT - I

Introduction - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning

Concept learning and the General to Specific Ordering – Introduction, A concept learning task, Concept learning as search, Find-S finding a maximally specific hypothesis, Version spaces and the Candidate-Elimination algorithm, Remarks on version spaces and Candidate-Elimination, Inductive Bias

### UNIT - II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms

### UNIT-III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm

### UNIT-IV

Computational learning theory – Introduction, Probability Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The Mistake Bound Model of Learning

Instance-Based Learning- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

### Unit- V

Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

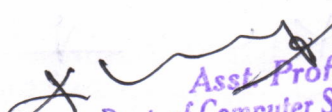
### TEXT BOOKS

Machine Learning – Tom M. Mitchell, - MGH

### REFERENCE BOOKS

Introduction to Machine Learning, - Ethem Alpaydin, - PHI

Machine Learning An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

  
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## **403CP24: Mobile Computing with Android**

### **UNIT – I**

What is Android? Features of Android, Architecture of Android, Eclipse, Android SDK, ADT, Creating Android virtual devices, Creating Application and Anatomy application.

Understanding Activities – Applying styles and themes to activity, hiding the activity title, displaying a dialog window, displaying a progress dialog. Linking Activities using intents. Calling built-in applications using intents.

### **UNIT – II**

Understand the components of a screen, Adapting to display orientation, managing changes to screen orientation, creating the user interface programmatically, listening for UI notifications. Basic views, pickers views, list views.

### **UNIT – III**

Using images views to display pictures, using menus with views and some additional views. Saving and loading User preferences, persisting data to files, creating and using databases,

### **UNIT – IV**

Sharing data in android, using a content provider, creating your own content provider, SMS messaging, e-mails and networking. Displaying Maps

### **UNIT – V**


Creating own services, communicating between a service and an activity, binding activities to services, publishing, deploying APF files and eclipse.

### **Prescribe Book**

Beginning Android 4 Application Development, Wei-MengLee, Wiley

### **Reference Books**

Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox).

  
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