Revised Syllabus

II Year
Master of Computer Applications

(Effective from the Session 2014-15)
ICA-301
SOFTWARE ENGINEERING

Unit-I: Introduction

Unit-II: Software Requirement Specifications (SRS)


Unit-III: Software Design

Unit-IV: Software Testing

Unit-V: Software Maintenance and Software Project Management

Text and Reference Books:
5. Ian Sommerville, Software Engineering, Addison Wesley.
6. Pankaj Jalote, Software Engineering, Narosa Publication
Unit-I

Introduction:

Unit-II

Elementary Data Structure: Stacks, Queues, Linked list, Binary Search Tree, Hash Table
Advanced Data Structure: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Heap, BTree, Fibonacci Heap, and Data Structure for Disjoint Sets
Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues

Unit-III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis

Unit-IV

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal’s Algorithms, Prim’s Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem

Unit –V


References
2. Coremen Leiserson etal, “Introduction to Algorithms”, PHI
ICA-303
DATABASE MANAGEMENT SYSTEM

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Unit- I
**Introduction:** An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

**Data Modeling using the Entity Relationship Model:** ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Unit- II
**Relational data Model and Language:** Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

**Introduction to SQL:** Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Unit- III
**Data Base Design & Normalization:** Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit- IV
**Transaction Processing Concepts:** Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit- V
**Concurrency Control Techniques:** File Organization and Accessing, Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version schemes, Recovery with concurrent transaction. Transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database.

**Text and Reference Books**
1. Date C J, “An Introduction To Database System”, Addision Wesley
ICA-304
INTERNET & JAVA PROGRAMMING

Unit- I
Introduction to Internet and Internet Services, HTML: Formatting tags, Links, Lists, Tables, Frames, Forms, Comments in HTML, DHTML
Core Java: Introduction, Operator, Data types, Variables, Arrays, Control Statements, Methods & Classes, Inheritance, Packages and Interface.

Unit-II
Core Java: Exception Handling, Multithread Programming, I/O, Applet, String handling, Networking, Event Handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics, JDBC

Unit-III
Java Servelets: Servelet Life Cycle, HTTP Servelet Class, Request Interface, Response Interface, Session Tracking (Cookies VRL)
JSP: Overview, Relation of Applet and Servelet with JSP, Scripting Element, JSP Expressions, JSP Scriplets, Predefined Variables, Creating Custom JSP Tag Libraries, Using Nested Tags, Structuring Generated Servelet in JSP Pages, Including Files and Applets in JSP Documents, Integrating Servelet and JSP.

Unit-IV

Unit-V

Text and Reference Books:
1. Margaret Levine Young, “The Complete Reference Internet”, TMH
3. Balagurusamy E, “Programming in JAVA”, TMH
4. Dustin R. Callway, “Inside Servlets”, Addison Wesley
ICA - 351
DBMS LAB

The programme to be implemented using SQL
1. Create Table, SQL for Insertion, Deletion, Update and Retrieval using aggregating functions.
2. Write Programs in PL/SQL, Understanding the concept of Cursors.
3. Write Program for Join, Union & intersection etc.
5. Creating Forms, Reports etc.
6. Writing codes for generating read and update operator in a transaction using different situations.
8. Developing code for understanding of distributed transaction processing.
9. Students are advised to use Developer 2000 Oracle 8+ version for above experiments.

However, depending on the availability of Software’s students may use power builder/SQL Server/DB2 etc. for implementation?

ICA-352
Internet & Java Programming Lab

1. Design a HTML page to display your CV
2. Design a HTML form to reserve a railway ticket.
3. Write a Java Script program that finds the greatest common divisor of two numbers.
4. In the form mentioned in problem 2 to reserve a railway ticket add the following validations using java script.
   - From city and to city are two different cities.
   - Age of passengers should not be greater than 150.
   - Name of the passenger should be a string of a maximum length 20.
5. Write a program for illustrating client/server side scripting with help of ASP.
6. Write a piece of code in XML for creating DTD, which specifies set of rules.
7. Create style sheet in CSS/XSL and display the document in Internet Explorer.
UNIT – I
Object Oriented Design and Modeling: Object oriented fundamentals, Objects and Classes, Links and Associations, Generalization and Inheritance, Aggregation, Abstract Classes, Object-Oriented Design Process, importance of modeling, principles of modeling, OOAD Methods.

UNIT - II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT- III

UNIT-IV

UNIT – V
Object-Oriented Programming Languages, Dominant features of C++, Java and C#. Object Oriented Database design, Modern Object technologies and web services.
Case Study: The Unified Library Application.

Text and Reference Books:
5. Mark Priestley: Practical Object-Oriented Design with UML, TATA Mc-GrawHill
ICA-402
COMPUTER GRAPHICS AND ANIMATION

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Unit-I

Unit-II

Unit-III
2-D and 3-D Transformations: Basic Transformations: Translation, Rotation, Scaling, Shear, Composite Transformations: Rotations about a point, Reflection about a line, Homogeneous Coordinate Systems, 3-D Transformations, 3-D geometry primitives, Viewing Transformation, Projections: Parallel Projection, Orthographic & Oblique Projections, Perspective Projections. Interaction: Hardware input devices handling algorithms, Event handling echoing, Interactive techniques.

Unit-IV
Hidden Line and Surface: Back face removal algorithms, hidden line methods. Rendering and Illumination: Introduction to curve and Surfaces generation, Bezier, Hermite and B-spline algorithms and their comparisons.

Unit-V

Text and References Books:
ICA-403
FUNDAMENTALS OF E-COMMERCE

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Unit I

Network Infrastructure for E-Commerce: Internet and Intranet based E-commerce-Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Unit II

Unit III

Unit IV
Encryption: Encryption techniques, Symmetric Encryption- Keys and data encryption standard, Triple encryption, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit V
Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

Text and Reference Books:
2. Bajaj and Nag, “E-Commerce the cutting edge of Business”, TMH
Unit-I
**Introductory Concepts:** Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer-transmission, switching methods, Integrated services digital networks, terminal handling.

Unit-II
**Medium access sub layer:** Channel allocations, LAN protocols, ALOHA Protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Link Layer- elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control

Unit-III
**Network Layer:** Point-to Point networks, Routing algorithms, Congestion control algorithms, Internetworking, TCP/IP packet, IP addresses, IPv6.

Unit-IV

Unit-V

**Text and Reference Books:**
3. Comer, “Computer Networks & Internet”, PHI.
4. Comer, “Internetworking with TCP/IP”, PHI
5. Forouzan, “Data Communication and Networking”, TMH
Unit-I
Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

Unit-II

Unit-III
Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

Unit-IV
Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

Unit-V
Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

Text and Reference Books:
UNIT-I: Introduction

UNIT-II: Real Time Scheduling

UNIT-III: Resources Access Control

UNIT-IV: Multiprocessor System Environment
Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

UNIT-V: Real Time Communication

Text and Reference Books:
Unit-I: Introduction
Faults, Errors, and Failures, Basics of software testing, Testing objectives, Principles of testing, Requirements, behavior and correctness, Testing and debugging, Test metrics and measurements, Verification, Validation and Testing, Types of testing, Software Quality and Reliability, Software defect tracking.

Unit-II: White Box and Black Box Testing
White box testing, static testing, static analysis tools, Structural testing: Unit/Code functional testing, Code coverage testing, Code complexity testing, Black Box testing, Requirements based testing, Boundary value analysis, Equivalence partitioning, state/graph based testing, Model based testing and model checking, Differences between white box and Black box testing.

Unit-III: Integration, System, and Acceptance Testing
Top down and Bottom up integration, Bi-directional integration, System integration, Scenario Testing, Defect Bash, Functional versus Non-functional testing, Design/Architecture verification, Deployment testing, Beta testing, Scalability testing, Reliability testing, Stress testing, Acceptance testing: Acceptance criteria, test cases selection and execution,

Unit-IV: Test Selection & Minimization for Regression Testing
Regression testing, Regression test process, Initial Smoke or Sanity test, Selection of regression tests, Execution Trace, Dynamic Slicing, Test Minimization, Tools for regression testing, Ad hoc Testing: Pair testing, Exploratory testing, Iterative testing, Defect seeding.

Unit-V: Test Management and Automation

Text and Reference Books:
Unit-I

Unit-II

Unit-III
Nature and scope of computer crime, Types of Cyber crimes- Hacking, Tampering with Computer source documents, cyber pornography, cyber stalking, cyber terrorism, cyber squatting, Cyber contraventions Penalties under the Act, Investigation, Procedure for search & Seizure, Liability of Network Service Providers.

Unit-IV
Intellectual Property Right issues in Cyberspace, Concept of property in Cyberspace, Copyright and related issues, Issues relating to Trademarks and Domain names, Liability for Hyperlinking and Metatags, Domain Name Dispute Resolution Policy, Role of ICANN.

Text and Reference Books:
4. Dr. Sundeep Oberoi - E-Security and you.
Unit-I
Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon’s theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.

Unit-II
Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat’s and Euler’s theorem, primality testing, Euclid’s Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffie-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.

Unit-III

Unit-IV
Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.

Unit-V

Text and Reference Books:
ICA-451
Object Oriented System Lab

Write programs in C/C++ for
1. Program illustrating overloading of various operators.
2. Program illustrating use of Friend, Inline, Static Member functions, default arguments.
3. Program illustrating use of destructor and various types of constructor.
4. Program illustrating various forms of Inheritance.
5. Program illustrating use of virtual functions, virtual Base Class.
6. Program illustrating how exception handling is done.
7. Program implementing various kinds of sorting algorithms, Search algorithms & Graph algorithms.

ICA-452
CGA Lab.

Write Program in C or C++ for following.
1. Implementation of line generation using slope’s method, DDA and Bresenham’s algorithms.
2. Implementation of circle generation using Mid-point method and Bresenham’s algorithm.
3. Implementation of ellipse generation using Mid-point method.
4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven program).
7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
10. Implementation of Curve generation using B-spline and Bezier curves.