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Revised Syllabus For M.C.A. Part-II (Semester- III) and (Semester-IV)

Syllabus to be implemented from June 2014 onwards.
### SEM-III

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title of the Course</th>
<th>Credits</th>
<th>Teaching Scheme(h/w)</th>
<th>Evaluation Scheme (Marks)</th>
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<tr>
<td>CS1311</td>
<td>Computer Communication Network</td>
<td>4</td>
<td>4</td>
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<td>CS1312</td>
<td>Java Programming</td>
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<tr>
<td>CS1314</td>
<td>Elective-I</td>
<td>4</td>
<td>4</td>
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<tr>
<td>CS1331</td>
<td>Software Engineering(CBCS)</td>
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<td>4</td>
<td>20 80 100</td>
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<tr>
<td>CS1315</td>
<td>Data Structure and Java Lab</td>
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<td>12</td>
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<tr>
<td>CS1316</td>
<td>Project and Viva</td>
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<td>20 80 100</td>
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### SEM-IV

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<td>Theory Of Languages</td>
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<td>CS1413</td>
<td>Artificial Intelligence</td>
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<td>12</td>
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<td></td>
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<td>24 140 560 700</td>
</tr>
</tbody>
</table>
Unit I  
15 hrs

Unit II  
15 hrs

Unit III  
15 hrs
UDP, TCP: (segment format, connection establishment, termination, sliding window, adaptive retransmission) Congestion control: Queuing discipline, TCP Congestion control – Congestion avoidance Mechanism.

Unit IV  
15 hrs

References:
Objectives:

To introduce a student to an entirely a new way to build distributed, desktop and mobile applications. To provide a student with the solid foundation of the syntax and semantics of java Programming as well as application architecture, data access technology geared to facilitate the development of distributed systems. To familiarize the student with the development of N tier web-based applications

Unit 1


Popular Java Editors : Introduction to Eclipse and NetBeans IDE.

(15 Hr)

Unit 2


(15 Hr)

Unit 3


(15 Hr)

Unit 4

JTabbedPane, JTable and JTree.

(15 Hr)

**Text Book:**
1. Java Complete Reference by Patric Norton

**References:**
4. Java 2 Programming Black Book by Steven Holzner, Dream Tech Publication
Department Of Computer Science  
Credit System Syllabus  
Master Of Computer Application  
SEM-III  

Paper- XIII (CS1313) : Data Structures

UNIT-I  

(15)

UNIT-II  
Queues : Processing the queues, Linked list implementation, Deques, Priority queues and their applications. Stacks : Processing the stacks, Linked list implementation, Application of Stacks for expression solving, Non recursive implementation of recursive algorithm. Hashing: Functions, collision resolution techniques.  

(15)

UNIT-III  
Trees : Representation of hierarchical relationships, General Trees, Binary trees, Binary search trees, linked list implementation, traversal algorithms, threaded binary trees, height balanced trees, Heap tree, Huffman tree, B-tree indexing, Trie tree. Graph: Graph representations, Breadth first and Depth first search, Topological sort, Single source Shortest path, Minimum Spanning tree, applications of graph.  

(15)

UNIT-IV  
Design and analysis of algorithm: Greedy methods, Dynamic programming, Backtracking, Divide and conquer. Garbage collection techniques, Memory Management techniques and effective use of data structures, introduction to Euler’s graph, seven bridge problem.  

(15)

Reference:  
1. Aho, Hop craft and Ulman, Data structures and algorithms (Addision - Wesley)  
2. Data Structures using C and C++ - Tanenbaum  
3. Classic data structures- D. Samantha- PHI  
5. R.L.Kruse, Data Structures and Program design (PHI-96)
Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III

Paper- XIV (CS1314) : Distributed Operating System

Unit I 15 hrs

Unit II 15 hrs
Introduction to Distributed system :Goal, Hardware Concepts, Software concepts, Design issues Communication in distributed system : Layered protocols, client server model, remote procedure call, group communication, Comparison of Client Server Vs. Distributed operating system.

Unit III 15 hrs
Synchronization in distributed system : Clock synchronization, mutual exclusion, election algorithms, automatic transaction, deadlocks in distributed systems. Processes and processors in distributed systems: Threads, System models, Processor allocation, Scheduling in distributed systems.

Unit IV 15 hrs
Distributed file system : Distributed file system, Design and Implementation trends in distributed file system. Case study : MS-windows NT and Novel Netware

References
1. A.S. Tanenbaum - "Modern Operating Systems" (PHI)
2. A.S. Tanenbaum - "Distributed Operating Systems" (pearson)
3. Helen Custer - "Inside Windows NT" (Microsoft Press)
Unit 1: Basics Of Developing For Embedded Systems

15 hrs

UNIT 2: Introduction To Real-Time Operating Systems

15 hrs

UNIT 3: Memory Management

15 hrs

UNIT 4: Programming Languages and Tools: Desired languages characteristics, data typing, control structures, facilitating hierarchical decomposition, packages, run time errors handling, overloading and generics, multitasking, low programming, task scheduling, timing specification, some experimental languages, programming environments, run time support.

Real Time Databases: Basic definitions, real time vs general purpose databases, main memory databases, transaction priorities, transaction aborts, concurrency control issues, disk scheduling algorithms, a two phase approach to improve predictability, maintaining serialization consistency, database for hard real time systems. RTOS example.

15 hrs

Reference books
Objectives:

This course will introduce students to the concepts of open source softwares and familiar with the Knowledge of Linux systems which is essential for FOSS due to the very strong affinity between Linux systems and FOSS and the widespread availability of FOSS implementations on Linux clonesystems, such as GNU/Linux and FreeBSD. The course will familiar students with FOSS database and programming language and for development of websites with mysql and php.

UNIT I  
15 hrs


UNIT II  
15 hrs


UNIT III  
15 hrs

Validating Data Entry – Form Handling – Cookies – Session Tracking, PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, Building Web sites, Updating Web sites Scripts.

UNIT IV  
15 hrs

MySQL: Getting Started with MySQL – Basic Data Types – Database and Table Creation – Performing Operations on Table Data – Running Calculations on Table Data – Grouping the Data – Functions in MySQL - Database Access with PHP and MySQL. Eclipse, an Integrated Development Environment.

Text Books:

1. UNIX Concepts & Applications Sumitabha Das (THM)
2. The Design of the UNIX Operating System Maurice J. Bach (Pearson Education)
5. The World of Scripting Languages, David Barron, Wiley India.
Objective:
Software engineering is an engineering approach for software development.

Unit 1
Introduction to Software Engineering: Computer based business systems, Importance of Software and Software Engineering, Software Engineering Paradigms. Role of user and analyst, structured methodologies and CASE. Requirement analysis: Fact finding and interviews, review and assignment, feasibility study, Data modeling and process modeling, tools of modeling, DFD, ERD, prototyping and 4GL, RAD, classical as well as computer aided techniques.

Unit 2
Design: Input, Output and Process Design, Design and controlling the screens, formatting the reports. File Design, Data storage methods, Human Computer interface design. Software design, Program Definition and module design. Guidelines for designing, Design walk through and design review, Use of CASE. Coding standards: Top-Down and Bottom-Up approaches, structured programming, documentation and other good programming practices, code verification.

Unit 3
Testing: Errors, Faults and failures, Test cases, test criterion, test plan, Functional testing, Structural testing, analysis and evaluation of testing. Software Maintenance: Definition of maintenance, Maintenance characteristics, maintainability, maintenance, tasks, maintenance side effects, reverse engineering and reengineering. Software configuration management, software reusability.

Unit 4

References:
7. Grady Booch, Rober A., Object Oriented Analysis and Design With Applications(Addison-Wesley)
Department Of Computer Science  
Credit System Syllabus  
Master Of Computer Application  
SEM-IV  
PAPER- XVI(CS1411) : ADVANCED JAVA

Objectives:
To introduce a student to an entirely a new way to build distributed, desktop and mobile applications. To provide a student with the solid foundation of the syntax and semantics of java Programming as well as application architecture, data access technology geared to facilitate the development of distributed systems. To familiarize the student with the development of N-tier web-based applications

Unit 1. Server-side Java
Java Servlets: Servlet basics, servlet life cycle, Generic and HTTP servlets, The Servlet API,javax.servlet and javax.servlet.http package, session tracking using session and cookies, web deployment descriptor, web.xml. databases. Request dispatching. JSP(Java Server Pages: Introduction to JSP, Use of JSP, JSP Architecture, JSP tags, Implicit and Explicit objects, Request forward, Request –time include ,use of Beans in JSP and their scopes. Introduction to Eclipse IDE. Java Database Connectivity. JDBC overview, Architecture, Types of JDBC Drivers, DriverManager class, database connection statements, ResultSet, transaction, Metadata and Aggregate functions, callable statements, Connection to various back ends.Introduction to XML for Java, XML processors, construction & generating XML documents, manipulating DOM structure, Interfacing Databases & XML. Introduction to XSL and XSL syntax. (15 Hr)

Unit 2 : Distributed Computing using Java
Remote Method Invocation–Introduction, architecture, defining remote objects, creating stubs and skeleton, object serialization, dynamically loaded classes, RMI activation, registering remote objects, marshaled objects. RMISecurityManager class. CORBA-concepts, history of CORBA and OMG. Object bus, distributed objects, interoperability of distributed objects, concept of open object bus, A java interface to CORBA, Architectural features, Method Invocations: Static and Dynamic, ORB. Creating a basic CORBA server in Java, creating CORBA clients with Java IDL, RMI v/s CORBA, Basic CORBA Services, CORBA Naming Service in detail. (15 Hr)

Unit 3 : Developing Enterprise Application in Java

Unit 4 : Introduction to Java FrameWorks.
JSF(Java Server Faces) - Introduction of JSF, Components of JSF, Benefits of JSF, disadvantages of JSF, JSF Application life cycle, Components and Renderers UIComponents- UIVewRoot,

Text Book:
1. Orfali, "The essential Distributed Object Survival Guide".

References:
2. Beginning Hibernate - From Novice to Professional- Dave Minter and Jeff Linwood. Apress
Unit - I
Introduction to the theory of computation: Symbol, alphabet, sets, relations and functions, strings and languages. Finite state machines: Finite automata definition & description, transition system, DFA, NFA, equivalence of DFA and NFA, finite automata with outputs, Moore machine, Mealy machine, equivalence between Moore and Mealy machines. (15)

Unit – II
Regular expressions and regular grammars: Regular expressions, equivalence of regular expressions and FA, Arden’s theorem, Minimization of DFA, NFA with null transition, Elimination of null transition, Regular sets and properties: Pumping lemma for regular sets, closure properties of regular sets. (15)

Unit - III
Context free languages: Introduction, context free grammars, Simplification of CFG, derivation trees, leftmost and rightmost derivations, ambiguity in CFG, normal forms-Chomsky normal form CNF, Greibach normal form GNF. Pumping Lemma for Context free Languages. (15)

Unit - IV
Pushdown automata: Definition of PDA, acceptance by empty stack, acceptance by final state, deterministic PDA, nondeterministic PDA, closure properties of CFL’s, Decision algorithms for CFL, Turing machines: Turing machine model, representation of Turing Machine, design of Turing Machine, types of TM. (15)

References:
Unit-I

Unit-II
Knowledge representation and inference: Adequacy, richness, granularity, ease of representation and use, modelling uncertainty, the frame problem, declarative and procedural representations, equivalence in representations. Logic programming: Overview of Propositional and Predicate logic, representation, atom, connectives, literals, CNF, DNF and clause form, interpretation and modeling, satisfiability, resolution principle and unification algorithms. e. Rule based system design issues: rules - working memory, rulebase, conflict set, conflict resolution strategies (including specificity, recency, refractoriness), backword and forward chaining, metarules. (15)

Unit-III

Unit-IV

REFERENCES
1. David Rolston; Principles of AI and Expert system development (MGH, 1988)
2. E.Ritch and K. Knight; Artificial Intelligence (MGH)
4. M. Sasikumar, S. Ramani, S. Muthuraman; Knowledge base reasoning systems (NAROSA)
5. Smith; Expert system development in Prolog and Turbo Prolog
Unit I                                                                                                                    (15)
Introduction: Data mining concepts, Data mining functionalities, classification of data mining systems, Integration of data mining system with a database or data warehouse system, major issues in data mining Data Preprocessing: aggregation, Sampling, Dimensionality reduction, Feature subset selection, Feature creation, discretization and Binarization, variable transformation. Measures of similarity and dissimilarity: Basics, similarity and Dissimilarity between simple attributes, dissimilarities between data objects, and similarities between data objects, Simple matching coefficient, Jaccard Coefficient, Cosine similarity, Extended Jaccard Coefficient.

Unit II                                                                                                                (15)

Unit III                                                                                                               (15)

Unit IV

Reference books:
1) Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson education.
2) Data Mining concepts and techniques --- Jiawei Han and MichelineKamber , Elsevier
3) Data Mining: Introductory and Advanced Topics - Margaret H. Dunham, Pearson education
4) J. Han, M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India / Morgan Kaufman,
Unit 1
Basic Encryption and decryption: Attackers and Types of threats, challenges for information security, Encryption techniques, Classical Cryptographic Algorithm: Monoalphabetic Substitutions such as the Caesar, cryptanalysis of Monoalphabetic ciphers, Polyalphabetic Ciphers, Polyalphabetic Ciphers as Vigenere, Vernam Cipher, Stream and Block Ciphers. (15)

Unit 2

Unit 3
Hash Algorithms: hash Algorithms, Message Digest such as MD4 and MD5, secure Hash algorithms such as SH1 and SHA2. Network Security: Network Security issues such as Impersonation, Message Confidentiality, Message Integrity, Code Integrity, Denial of Service, Firewalls, DMZs, Virtual Private Networks, Network Monitoring and Diagnostic Devices. (15)

Unit 4

References:
3. Cryptography and Network Security, Atul Kahate, TMH.
Unit 1
INTRODUCTION : Algorithm, pseudo code for expressing algorithms, analysis, time complexity and space complexity, \(O\)-notation, Omega notation and theta notation, Heaps and Heap sort, Sets and disjoint set, union and find algorithms. DIVIDE AND CONQUER : General method, merge sort, quick sort, strassen’s matrix multiplication. (15)

Unit 2
GREEDY METHOD : Genera method, optimal storage on tapes, knapsack problem, job sequencing with deadlines, minimum spanning tree, Sgle source shortest paths.
DYNAMIC PROGRAMMING : General method, Multistage Graphs, optimal binary search trees, O/1 knapsack problem, reliability design problem, Traveling sales person problem, floor shop scheduling. (15)

Unit 3
SEARCHING AND TRAVERSAL TECHNIQUES : Efficient non recursive binary tree traversal algorithms, tree traversal, breadth first search and traversal, depth first search and traversal, AND / OR graphs, game tree, Bi-connected components. (15)

Unit 4
BACK TRACKING : General method, n-queen problem, sum of subsets problem, graph colouring, Hamiltonian cycles. BRANCH AND BOUND : LC search, bounding, LC branch and bound, FIFO branch and bound, Travelling sales person problem. NP – HARD AND NP - COMPLETE PROBLEMS : Basic concepts, non-deterministic algorithms, NP- HARD and NP-COMPLETE classes, COOKS theorem. (15)

BOOKS :
1. E. Howrowitz and Shani, Fundamentals of computer algorithms, GALGOTIA PUBLICATIONS.
Department Of Computer Science  
Credit System Syllabus  
Master Of Computer Application  
SEM-IV  

Paper- (CS1431) :SOFTWARE QUALITY ASSURANCE (CBCS)

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**Objectives:**

This paper is aimed at generating the awareness about the software project management and the factors related to it. In this paper project planning risk analysis, software testing, configuration management will be taught to the students.

**Unit 1.**

Software Project management- Management spectrum, the people, the product, the process, the project, WmM principle, critical practices Metrics for process and projects- metrics in process and project domain, software measurement, metrics for software quality, integrating metrics within software process, metrics for small organizations, establishing metrics program. Estimation- Observations, planning process, scope and feasibility, resources, project estimation, decomposition techniques, empirical estimation models, estimation of object oriented project, specialized estimation techniques, Make/Buy decision.  

(15)

**Unit 2.**

Project scheduling and risk management- concepts, project scheduling, defining the task set, defining the task network, scheduling, earned value analysis. Reactive Vs. Proactive risk strategies, software risks, risk identification, risk projection, risk refinement Risk mitigation, monitoring and management, The RMMM plan. Quality management- product metrics- software quality, framework for product metrics, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, Quality concept, software quality assurance, software reviews, formal technical reviews, formal approaches to SQA, Statistical SQA, software reliability models. SQA plan. Defect classification and Analysis.  

(15)

**Unit 3.**


(15)

**Unit 4.**


(15)
References:
1. Pressman R.S. Software Engineering A Practitioner's Approach
3. Basics of Software project management, PHI, NIIT
11. QuickTest Professional by Vinnakota Ravi Sankar (covers QTP 9.2, 9.5 and 10)