

SHIVAJI UNIVERSITY, KOLHAPUR.



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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

Course Code	Title of the Course	Credits	Teaching Scheme(h/w)		Evaluation Scheme (Marks)		
			L	P	CIE	SE	Total
CS1311	Computer Communication Network	4	4	-	20	80	100
CS1312	Java Programming	4	4	-	20	80	100
CS1313	Data Structures	4	4		20	80	100
CS1314	Elective-I 1. Distributed O.S. 2. Real Time O.S. 3. Open Source Languages	4	4	-	20	80	100
CS1331	Software Engineering(CBCS)	4	4	-	20	80	100
CS1315	Data Structure and Java Lab	4		12	20	80	100
CS1316	Project and Viva	4		12	20	80	100
Total		28	20	24	140	560	700

SEM-IV

Course Code	Title of the Course	Credits	Teaching Scheme(h/w)		Evaluation Scheme (Marks)		
			L	P	CIE	SE	Total
CS1411	Advanced Java	4	4	-	20	80	100
CS1412	Theory Of Languages	4	4	-	20	80	100
CS1413	Artificial Intelligence	4	4		20	80	100
CS1414	Elective-II 1. Data Mining 2. Network Security 3. Design and Analysis Of Algorithms	4	4	-	20	80	100
CS1431	Software Quality Assurance(CBCS)	4	4	-	20	80	100
CS1415	Advanced Java and TL Lab	4		12	20	80	100
CS1416	Project and Viva	4		12	20	80	100
Total		28	20	24	140	560	700

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III

Paper- XI (CS1311) : Computer Communication Networks

Unit I **15 hrs**

Network architecture: Layering and protocols, OSI Architecture, Internet Architecture **Physical links** – Nodes , links , Physical Media , encoding (NRZ, NRZI, Manchester), **Issues in the data link layer** - Framing (PPP, HDLC, SONET) Error correction and detection (Two Dimensional parity, CRC)

Unit II **15 hrs**

Ethernet (802.3), Rings (802.5) FDDI , wireless (Bluetooth, WIFI, WIMAX) , Packet switching, circuit switching , datagram, virtual circuits, Bridges and LAN Switches, **Internetworking** : IP, ARP, RARP , DHCP , ICMP, **Routing:** RIP – OSPF – Subnetting – CIDR – Interdomain routing – BGP – Ipv6 – Multicasting –

Unit III **15 hrs**

UDP, TCP : (segment format, connection establishment, termination, sliding window, adaptive retransmission) **Congestion control** : Queueing discipline, TCP Congestion control – Congestion avoidance Mechanism

Unit IV **15 hrs**

Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP – **Network Security:** Cryptography, Ciphers, public-key cipher, symmetric-key cipher, Key Predistribution **Authentication protocol:** public key, symmetric key , **secure systems:** PGP – SSH TSL, SSL

References:

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Third Edition, Morgan Kaufmann Publishers Inc., 2003.
2. Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, 2003.
3. James F. Kuross, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Addison Wesley, 2004.
4. Comer, “Computer Networks and Internets with Internet Applications”, Fourth Edition, Pearson Education, 2003.
5. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III

Paper- XII (CS1312) : Java Programming

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

Structure and Execution of Java application, Java Virtual Machine. Memory Management in Java. Working of garbage collector.OOPS in JAVA: Objects and classes, Encapsulation, Inheritance, polymorphism, Interfaces, inner classes, Packages. Classpath and package hierarchy. Introduction to Java Utility classes and collection classes – String, StringBuilder, Date, DateFormat and GregorianCalendar classes. Using ListInterface, ListIterator and LinkedList classes. Set, Iterator, SortedSet, Map interfaces. HashSet class. Using Vector class, stacks, queues, HashTable. Generating random numbers, Property class. Object services. Understanding core packages. Wrapper classes.\Popular Java Editors : Introduction to Eclipse and NetBeans IDE.

(15 Hr)

Unit 2

I/O Streams : I/O Streams, Java Stream Hierarchy, Various types of Input & Output streams, accessing the file through streams, Random Access File. Object serialization. Serializable and Externalizable interfaces.Exception Handling: Exception Vs Error, try, catch, throw, throws, finally, nested exceptions, checked and unchecked exceptions. Custom exception classes.

(15 Hr)

Unit 3

Multi Threading: Need for threading, comparison between a process and a thread. Two ways to create a thread in Java. Thread states and priorities, synchronization between threads. Inter thread communication and dead locks.Network programming: Client and Server programming, Socket, IP address classes. InetAddress, URL and URLConnection classes. Client Server interaction using TCP. Connectionless client server interaction using UDP.Applets and Java Security Applet and its life cycle methods, passing parameters to applets. AppletViewer. Restrictions of Applets. Java.security package – Permissions and security policy. Policy class. Signing JAR files.

(15 Hr)

Unit 4

GUI and Event Handling: Introduction to AWT and Swing, working with Frame, Windows. Graphics, Font, Color, image classes. AWT controls. Layout managers, various components for GUI. Various events, listener classes, and adapter classes. Role of anonymous inner classes in event handling. ImageObserver. Image processing using PixelGrabber and MemoryImageSource classes. Introduction to Swing. Difference between AWT and Swing. MVC architecture. Light weight and heavy weight components. Pluggable Look and Feel. Swing package and its components. BorderLayout and OverlayLayout Managers. Menus and Toolbars. Swing dialogs.

JTabbedPane, JTable and JTree.

(15 Hr)

Text Book:

1. Java Complete Reference by Patric Norton

References:-

1. Core Java Vol. I (Addison- Wesley) Sun Press ISBN – 981-405-861-0
2. Core Java Vol. II (Addison- Wesley) Sun Press ISBN – 981-4058-50-5
3. Thinking in Java, Bruce Eckel,, Addison – Wesley, ISBN: 9814035750
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

Fundamental notions: Primitives and composite data types, complexity of an algorithm, various sort, search algorithms and their complexities. Arrays : Representation, Multidimensional Arrays, sparse matrices, sparse matrix representation. Linked List : Processing linked list, Circularly linked list, Doubly linked list, Multilinked lists.

(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 (Addison - Wesley)
2. Data Structures using C and C++ - Tanenbaum
3. Classic data structures- D. Samantha- PHI
4. Karnighan B. and Ritchi D., The C Programming Language (PHI-88)
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
Overview of Operating System :Operating System- concept, structure, os services, Functionality, types of operating systems, Process,Process Management, Deadlock, CPU scheduling Memory management , Device and File management.

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 Implemetation 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)
4. P. K Sinha – “Distributed Operating Systems”

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III
Paper- XIV (CS1314) : REALTIME OPERATING SYSTEM

Unit 1 : Basics Of Developing For Embedded Systems

Introduction, Real Life Examples of Embedded Systems, Real-Time Embedded Systems, The Future of Embedded Systems, Overview of Linkers and the Linking Process, Executable and Linking Format, Mapping Executable Images into Target Embedded Systems.

15 hrs

UNIT 2 : Introduction To Real-Time Operating Systems

Introduction, A Brief History of Operating Systems, Defining an RTOS, The Scheduler, Objects, Services, Key Characteristics of an RTOS. Tasks: Defining a Task, Task States and Scheduling, Typical Task Operations. Semaphores: Defining Semaphores, Typical Semaphore Operations, Typical Semaphore Use, Resource Classification, Deadlocks, Priority Inversion

15 hrs

UNIT 3: Memory Management

Introduction, Dynamic Memory Allocation in Embedded Systems, Fixed-Size Memory Management in

Embedded Systems, Blocking vs. Non-Blocking Memory Functions, Hardware Memory Management Units.

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

1. Real-Time Concepts for Embedded Systems by Qing Li and Carolyn Yao, CMP book 2003
2. PaulOs: An 8051 Real Time Operating System by Paul P Debono.
3. Real Time Systems – By C.M.Krishna, Kang G. Shin (McGraw Hill International Edn.)
4. Real Time Systems – By Jane W.S.Liu, (Peasson Education Asia, 2001).

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III

Elective Paper- XIV(CS1314) : OPEN SOURCE LANGUAGES

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

The FOSS Revolution - History of Free/Open Source and BSD Software - FOSS Licences ,Need of FOSS, Advantages of Open Sources and its applications . Open source operating system: LINUX: Introduction of kernel and shell , process, system calls, Linux file system, Basic Commands, File Permissions,vi editor, Shell programming.

UNIT II

15 hrs

PHP Basics- Features,Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes,Variables, Constants,expressions,string interpolation, control structures .Function,Creating a Function,FunctionLibraries,Arrays,strings and Regular Expressions.

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)
3. T.V.Gopal, Open Source Software, Scitech Publications, Edition 2003
4. Dave W & others, Beginning PHP 5, Wiley-dreamtech, Edition 2004

5. The World of Scripting Languages, David Barron,Wiley India.
6. Beginning PHP and MySQL , 3rd Edition , Jason Gilmore,Apress Publications (Dream tech.).
7. Ivan Bayross, Sharanam Shah, MySQL 5 for Professionals, Shroff Publishers, Edition 2007.

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-III

Paper- XVI(CS1331) :SOFTWARE ENGINEERING(CBCS)

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.

15 hrs

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.

15 hrs

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.

15 hrs

Unit 4

Object oriented Analysis and data modeling:Object Oriented concepts – identifying objects – specifying attributes – defining operations – inter object communication – finalizing object definition – object oriented analysis modeling – data modeling – data objects, attributes and relationships . **Object oriented Design:Object oriented design concepts** – object oriented design methods – refining operations – program components & Interfaces – implementation detail design. **UML:** Introduction and Notations of UML.

15 hrs

References :

1. E. Awad , Homewood , System Analysis and Design (Irwin-79).
2. Fairley, Software Engineering Concepts, (Mc-GrawHill-85).
3. Krishna Moorthy, Handbook of Software Engineering.
4. Pankaj Jalote, Integrated approach to Software Engineering (Narosa - 91).
5. Perry Edwards, System Analysis and Design, (MMH-93).
6. R.S.Pressman, Software Engineering-Practitioners approach, (TMH -87).
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

Java Beans: Basics of designing JavaBeans, Java Bean design patterns, creating and using properties, using events to communicate with other components. Introduction to BDK. Parts of BDK. Deploying Java Beans in BDK.Enterprise Java Beans: Introduction to distributed Computing: Two-tier and Three tier architecture, EJB's role in Middle-tier. Enterprise Java Beans Architecture of EJB, Implementation and life cycle of Session, Entity and Message Driven Java beans. Comparison of EJB and CORBA. Introduction to JBoss and WebLogic Application server. Deployment descriptor for EJBs. Deployment descriptors for Enterprise applications. Structure of WAR and EAR files.

(15 Hr)

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- UIViewRoot,

UIForm, UIGraphic, UIInput, UIOutput, UIPanel, UISelect, UISelectMany, UISelectItem, UIMessages , Managed Beans andNavigation Struts Framework: An introduction to Struts, building a simple struts application. Action Servlet, Model, view and Controller layers, validator, declarative exception handling, Introduction to struts tag libraries and struts configuration files. Internationalization. AJAX with Struts 2.Spring and Hibernate: Spring API libraries, Designing spring applications. Spring persistence using JPA. Spring web flow, Using spring MVC to build web pages. Integrating and configuring hibernate. Building a simple application. Persistence life cycle. Spring and hibernate plug-ins for Eclipse. Spring application development using Eclipse IDE. (15 Hr)

Text Book:

1. Orfali, "The essential Distributed Object Survival Guide".
2. Valesky, "Enterprise Java Beans", Addison Wesley.
3. A Complete Reference Struts (Second Edition) - JamesHomes. Tata McGraw-Hill Edition.
4. Struts 2 - Black Book. (Second Edition). Kogent Solutions Inc. dreamtech press.

References:-

1. Beginning Spring Framework 2 - Thomas Van de Velde, Bruce Snyder, Christian DUPUIS, Sing Li, Anne Horton and Naveen Balani. Wrox Publications. Wiley India pvt Ltd.
2. Beginning Hibernate - From Novice to Professional- Dave Minter and Jeff Linwood. Apress

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV

Paper-XVII (CS1412) :THEORY Of LANGUAGES

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:

1. John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman: Introduction to Automata Theory, Languages and Computation, Pearson education.
2. Michael Sipser: Introduction to theory of computation, Thomson learning.
3. K.L.P. Mishra, N. Chandrasekaran: Theory of Computer Science, PHI publication.

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV
Paper-XVIII (CS1413) :ARTIFICIAL INTELLIGENCE

Unit-1

AI Problem Solving : Historical development of AI. Introduction to AI problems, State space representation, Heuristics, Heuristics evaluation functions, Problem reduction. b. Search methods : Generate and test, Hill climbing, means-ends analysis, Depth-first, breadth-first, Best-first searches, Exploiting domain constraints, dependency-directed backtracking, Minimax, Alpha-Beta pruning, Iterative deepening, A* and AO* algorithms. (15)

Unit-2

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 of atoms, 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, rule base, conflict set, conflict resolution strategies (including specificity, recency, refractoriness), backward and forward chaining, metarules. (15)

Unit -3

Structured representation : Semantic networks, frames, conceptual dependence, scripts; inheritance, default values, example systems, blackboards, truth maintenance systems. Uncertainty reasoning : Probability theory, Bayesian networks, certainty factor methods, basics of fuzzy logic, non-monotonic reasoning. Expert systems : Concept of Expert system, Difference between AI problem and Expert problem, architecture of expert system, rule based systems, MYCIN model of uncertainty. Programming in Prolog/LISP. (15)

Unit-4

Application of AI (Overview): Pattern recognition, Symbolic description, machine perception, line finding, interpretation semantics and models, object identification, speech recognition. Planning and Robotics : STRIPS, ABSTRIPS, NOAH, MOLGEN planners. Vision : Edge detection, point correspondences & stereopsis, surface directions. Natural Language Processing, Introduction to Neural network, Genetic algorithms. (15)

REFERENCES

1. David Rolston ; Principles of AI and Expert system development (MGH,1988)
2. E.Ritch and K. Knight; Artificial Intelligence (MGH)
3. M.Sasikumar,S.Ramani,S.Muthuraman; Rule base Expert System : Practical Introduction (NAROSA)
4. M.Sasikumar,S.Ramani,S.Muthuraman; Knowledge base reasoning systems(NAROSA)
5. Smith ; Expert system development in Prolog and Turbo Prolog
5. P.H.Winston; Artificial Intelligence(III ed)(Addison Wesley)
6. P.D.Wassermann ; Neural computing theory and practice (Van Nostrand,1989)
7. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education / Prentice Hall of India, 2004.

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV
Paper-XVIX (CS1414) :Data Mining

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)

Classification: Preliminaries, general approach to solve classification problem, Decision tree induction, Rule-based classifier, Nearest-Neighbor classifier, Bayesian Classifiers, Support Vector Machine.

Unit III

(15)

Association analysis: Problem definition, Frequent Itemset Generation, Apriori Principle, apriori algorithm, Maximal Frequent itemset, closed frequent itemset. FP-growth algorithm,. Sequential Patterns, Infrequent Patterns. Cluster analysis: Introduction, Types of Clustering, Types of Clusters. K-means algorithm, Agglomerative Hierarchical Clustering, DBSCAN, Prototype based clustering and Density based clustering.

Unit IV

Advanced Topics : Web Mining : Introduction, Web content Mining, Web structure Mining, Web Usage Mining Spatial Mining, Introduction ,Spatial Data Overview, primitives, Rules, Classification Temporal Mining-Introduction, Modelling Temporal events, Pattern detection, Sequence, Temporal association rules.

(15)

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 Kauffman, 2001.
- 5) Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education 2004.

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV

Paper- XVIX(CS1414) :NETWORK SECURITY

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

Secret Key Systems: The Data Encryption Standard(DES), Analyzing and Strengthening of DES, Introduction to Advanced Encryption Standard(AES) .Public Key Encryption System: concept and characteristics of public key Encryption system. Introduction to Merkle-Hellman Knapsacks. Rivest- Shamir- Adleman(RSA) Encryption. (15)

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

Web Security: Web Servers, Secure Electronic mail, Enhanced email, Pretty good privacy, Public key cryptographic standards. **Ethical Hacking:** Introduction to Ethical Hacking, terminology, Hackers, Crackers, and other related Terms Hactivism, threats, Hacking History, Ethical Hacking, Objectives and Motivations. (15)

References:

1. Principles of cryptography, William Stallings, Pearson education
2. "Security in Computing(2nd edition) Carles P. Pfleeger , 1996 , Prentice hall International, Inc.
3. Cryptography and Network Security, Atul Kahate, TMH.

**Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV**

Paper- XVIX(CS1414) :DESIGN AND ANALYSIS OF ALGORITHMS

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 : General method, optimal storage on tapes, knapsack problem , job sequencing with deadlines, minimum spanning tree, Single source shortest paths. DYNAMIC PROGRAMMING : General method, Multistage Graphs, optimal binary search trees, 0/1 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.
2. ULLMAN, Design and analysis of algorithms, Addison wisely – 1994.

Department Of Computer Science
Credit System Syllabus
Master Of Computer Application
SEM-IV

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

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, W3MM 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.

Software Quality Program - Software Quality Program Concepts – Establishment of a Software Quality Program –Software Quality Assurance Planning – An Overview – Purpose & Scope. Software Quality Assurance Standardisation. Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI’s CMM (15)

Unit 4.

Software Testing. Software Testing Techniques. Levels of software testing. Software Testing Development Life Cycle. Psychology of software testing. Economics of software testing. Software Requirements Specification. Requirements Traceability Matrix (RTM). Software Test Plan. Software Manual Testing. Component Testing. User Acceptance Testing (UAT). Testing Documentation. Software testing – Test Cases. Validation, Verification. Software testing versioning. Manual Vs Automation Testing. Benefits of Automation Testing.

Software Testing Automation Tools - Selenium IDE, JMeter, WebDriver. Introduction to QTP. Recording Modes, Object spy and Repositories. QTP check points. Testing Automation Frameworks. Data driven and hybrid frameworks.

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8. Gordon G Schulmeyer, “Handbook of Software Quality Assurance”, Third Edition, Artech House Publishers 2007.
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