BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Computer Science - Course Structure under CBCS

(applicable to the candidates admitted from the academic year 2009-2010 onwards)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Mathematical foundation for Computer Science	6	5	3	25	75	100
	Core Course – II (CC)	Object Oriented Analysis and Design	6	5	3	25	75	100
	Core Course – III (CC)	Advanced Java Programming	6	5	3	25	75	100
	Core Course – IV (CC)	Distributed Operating System	6	5	3	25	75	100
	Core Course – V (CC)	Java Programming Lab.	6	3	3	40	60	100
		Total	30	23				500
II	Core Course – VI (CC)	Advanced Microprocessors and Microcontrollers	6	5	3	25	75	100
	Core Course – VII (CC)	Compiler Design	6	5	3	25	75	100
	Core Course – VIII (CC)	Parallel Computing	6	5	3	25	75	100
	Core Course – IX (CC)	Microprocessors and Interfacing Lab.	6	4	3	40	60	100
	Elective – I	Any one from the list	6	4	3	25	75	100
		Total	30	23				500
III	Core Course – X (CC)	Distributed Technology	6	5	3	25	75	100
	Core Course – XI (CC)	XML and Web Services	6	5	3	25	75	100
	Core Course – XII (CC)	Distributed Technologies lab.	6	3	3	40	60	100
	Elective - II	Any one from the list	6	4	3	25	75	100
	Elective – III	Any one from the list	6	4	3	25	75	100
		Total	30	21				500
IV	Core Course – XIII (CC)	Computer Graphics	6	5	3	25	75	100
	Core Course – XIV	Open source Lab.	6	3	3	40	60	100
	Project Work	Dissertation=80 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	6	7	-	-	-	100
	Elective - IV	Any one from the list	6	4	3	25	75	100
	Elective - V	Any one from the list	6	4	3	25	75	100
		Total	30	23				500
		Grand Total	120	90				2000

List of Electives:

Elective I

1. Mobile Computing
2. Grid Computing

Elective II

1. Web Technologies
2. Data Mining and Data Warehousing
3. Pattern Recognition
4. Real Time Operating System (RTOS)

Elective III

1. Real time and embedded system
2. Network Security
3. Genetic Algorithms
4. Digital Asset Management

Elective IV

1. Open Source Technologies
2. Digital Image Processing
3. Artificial Neural Networks
4. Bio Informatics

Elective V

1. Pervasive Computing
2. Software Quality Assurance and Testing
3. Robotics
4. Software Project Management

Note:

Core Courses include Theory, Practicals & Project

No. of Courses	14 - 17
Credit per Course	4 - 5
Total Credits	70

Elective Courses

(Major based / Non Major / Internship)

No. of Courses	4 – 5
Credit per Course	4 – 6
Total Credits	20

	Internal	External
Theory	25	75
Practicals	40	60

Project

Dissertation	80 Marks	[2 reviews – 20+20	=	40 marks
		Report Valuation	=	40 marks]
Viva	20 Marks			20 marks

Passing Minimum in a Subject

CIA	40%	Aggregate 50%
UE	40%	

Core Course - I

Mathematical Foundations for Computer Science

Unit I

Propositions - evaluation - precedence rules -tautologies - reasoning using equivalence transformation - laws of equivalence - substitution rules - a natural deduction system. Deductive proofs - inference rules - proofs - sub proofs.

Unit II

Introduction - Cryptography - Ceaser Cyphor Coding - Matrix encoding - scrambled codes - Hamming metric - Hamming distance - Error detecting capability of an encoding.

Unit III

Assignment problem and its solution by Hungarian method. Project Scheduling by PERT - CPM: Phases of project scheduling - Arrow diagram - Critical path method - Probability and Cost Considerations in project scheduling - Crahing of Networks.

Unit IV

Testing of hypothesis : Tests based on normal population - Applications of chi-square, Student's-t, F-distributions - chi-square Test - goodness of fit - Test based on mean, means, variance, correlation and regression of coefficients.

Unit V

Graph - Directed and undirected graphs - Subgraphs - Chains, Circuits, Paths, Cycles - Connectivity - Relations to partial ordering - adjacency and incidence matrices - Minimal paths - Elements of transport network - Trees - Applications.

Text Books

1. "The Science of Programming", David Gries. Narosa Publishing House, New Delhi, 1993.
2. "Application Oriented Algebra", James L. Fisher, Dun Donnelly Publisher, 1977.
3. "Operation Research - An Introduction", Hamdy A.Taha, Macmillan Publishing Co., 4th edn., 1987.
4. "Fundamentals of Mathematical Statistics", Gupta,S.C. and V.K.Kapoor, Sultan Chand & Sons, New Delhi, 8^{th} edn., 1983.

5. "Fundamentals of Applied Statistics", Gupta.S.C. and V.K.Kapoor, Sultan Chand & Sons, New Delhi, 2nd edn., 1978.

References

1. "Discrete Mathematics", Seymour Lipschutz and Marc Laris Lipson, Second edition, Schuam's Outlines by Tata McGraw- Hill publishing Company Limited, New Delhi 1999.
2. "Operations Research", Kanti Swarup, P.K.Gupta and Man Mohan, Sultan Chand & Sons, New Delhi, 1994.
3. "Introductory Mathematical Statistics", Erwin Kryszig, John Wiley & Sons, New York, 1990.
4. "Probability and Statistics Engineering and Computer Science", Milton, J.S. and J.C.Arnold, McGraw Hill, New Delhi, 1986.

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CORE COURSE II - OBJECT ORIENTED ANALYSIS AND DESIGN

Unit I

OBJECT BASIS: Object Oriented Philosophy - Object - Object State, behaviors and methods. Encapsulation and information hiding Class Relationship among classes polymorphism, aggregation, object containment, meta classes.

Unit II

OBJECT ORIENTED METHODOLOGIES: Rumbaugh object Model, Booch methodology Jacobson methodology, patterns, frame works and unified approach.

Unit III

OBJECT ORIENTED ANALYSIS: Business object analysis use case driven approach - use case model. Object analysis - CRC cards - Noun phrase approach Identifying object relationships and methods.

Unit IV

OBJECT ORIENTED DESIGN: On design process - Design axioms - design patterns - designing classes. Case study.

Unit V

UML AND PROGRAMMING: Introduction to unified modeling language - UML diagrams - class diagrams and use case diagrams - State and dynamic models. Case study to inventory, sales and banking.

Text Book

1. Ali Bahrami, "Object Oriented Systems Development" Irwin-McGraw Hill, New Delhi, International editions, 1999.

References

1. Martin Fowler, Kendall Scott, "UML Distilled-Applying the standard Object Modeling Language", Addition Wesley 1977.
2. Grady Booch, "Object Oriented Analysis and Design with applications", II edition, Addition Wesley, 1994.

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Core Course III
Advanced Java Programming

Unit I

JDBC Overview - Connection Class - MetaData Function - SQLException - SQL warning - Statement - ResultSet - Other JDBC Classes.

Unit II

InetAddress - TCP/ IP client sockets - TCP/ IP server sockets - URL - URL Connection - Datagrams - Client/ Server application using RMI.

Unit III

Bean Development Kit - Jar Files - Introspection - Design Pattern for properties, events and methods - Constrained Properties - Persistence – Customizers

Unit IV

Life Cycle of Servlet - Generic Servlet - HTTP Servlet - Reading Initialization Parameters - Reading Servlet Parameters - Cookies - Session Tracking

Unit V

JApplet - Button - Combo - Trees - Tables - Panes - AWT Classes - working with Graphics, Color and Font

Text Books

1. Patrick Naughton & Herbert Schildt, "The Complete Reference: Java 2", Tata McGraw Hill, 1999. (Chapter - 18, 21, 24, 25, 26, 27)
2. Joseph Weber, "Using Java 2 Platform", Prentice Hall of India, 2000. (Chapter - 39, 40)

References

1. Deitel & Deitel, "Java How to Program", Prentice Hall, 5th Edition ,2002
2. Peter Haggar, "Practical Java: Programming Language Guide", Addison-Wesley Pub Co, 1st Edition, 2000
3. Bruce Eckel, "Thinking in Java", Pearson Eduction Asia, 2nd Edition, 2000

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Core Course – IV - Distributed Operating Systems

Unit I

Fundamentals: What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment.
Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology

Unit II

Message Passing: Introduction – Desirable features – Issues in PC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication

Unit III

Distributed Shard Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory – Consistency Models – Replacement Strategy – Thrasing – Other Approaches to DSM – Heterogeneous DSM – Advantages

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm

Unit IV

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

Unit V

Security: Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles

Text Book

Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003

References:

Distributed Operating Systems 1e, Andrew S Tanenbaum, PHI.

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Core Course – V - Java Programming Lab

JAVA PROGRAMMING LAB

1. Assume that a bank maintains 2 kinds of account for its customers, one called savings account and the other current account, The savings account provides compound interest and withdraw facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account falls below this level a service charge is imposed.

   Create a class Account that stores customers name, account number and type of account. From this derive the classes curr-acct and sav-acct to make them more specific to their requirements. Introduce the necessary methods in order to achieve the following tasks:
   a. Accept deposit form a customer and update the balance.
   b. Display any deposit interest
   c. Compute and deposit interest.
   d. Permit withdrawal and update the balance.
   e. Check for the minimum balance, impose penalty, if necessary and update the balance. Use constructors and methods to initialize the class members.

2. Write a program that accepts a shopping list of five items from the command line and stores them in a vector and accomplish the following:
   a. To delete an item in the list.
   b. To add an item at a specified location in the list.
   c. To add an item at the end of the list.
   d. To print the contents of the vector.

3. Implementation of the concept of multiple inheritance using interfaces and design a package to contain the class students and another package to contain the interfaces sports.

4. Develop a simple real-life application program to illustrate the use of multithreads.

5. Create a try block that is likely to generate three types of exception and then incorporate necessary catch blocks to catch and handle them appropriately.

6. Write a Java applet, which will create the layout below :

FORMAT

Enter your Name :

Enter your Age :

Select City : *Delhi *Madras

Select S/W : *Oracle *Visual Basic

*Java

OK CANCEL

Handle the following simple validations.

The name entered should be less than 25 characters wide.

Age entered should be done as the user exits the fields as well as when OK button is pressed. Hint use the Boolean action (Event evt, object arg).

7. Write an Applet which will play two sound notes in a sequence continuously use the play( ) methods available in the applet class and the methods in the Audio clip interface.

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Semester – II - Core Course - VI

Advanced Microprocessors and Micro Controllers

Unit I

Microprocessor with Memory Management and Protection: Features of 80286 – Internal Architecture: Register organization – Internal block diagram - Interrupts – Real and Protected Virtual Addressing – Interfacing memory and I/O devices with 80286 – Addressing modes – Math Coprocessor.

Unit II

Beginning of 32-bit Microprocessors: Architecture of 80386 – Register organization – Addressing modes of 80386 – Data types – Concepts of addressing in real and protected modes – Segmentation and Paging – Conversion of a linear address to a Physical address – features of 80486 – Architecture and Register organization of 80486.

Unit III

Processors of new millennium: Salient features of Pentium 4 – Modules of Pentium 4 Architecture: Front end module, Out of order execution engine, Execution module, Memory subsystem module – Superscalar Execution – Pipelining – Hyperthreading in Pentium – RISC processors: Basic features and Advantages only.

Unit IV

Microcontrollers: Architecture of 8051 – Register set – Memory and I/O addressing – Interrupts – Six addressing modes – Ports of 8051 and their operation - Architecture of 16-bit microcontroller 80196.

Unit V

Embedded systems and Real Time Operating Systems (RTOS): Introduction to multitasking – simple Embedded multitasking systems – RTOS – Tasks in RTOS – Scheduling of tasks – Resource protection by Semaphore concept – Examples of Applications: Temperature Monitor (Tasks, Programming, Hardware requirements, Dealing with numbers) – A model Train Controller – Length measurement for rolling paper.

Text Books:

1. Advanced Microprocessors and Peripherals – A.K.Ray & K.M.Bhurchandi, TMH, 2nd Edition, 2007.
2. 8051 Microcontroller & Embedded systems – Rajiv Kapadia, Jaico Publishing House, 2006.

Reference Books:

1. An introduction to the design of small scale embedded systems – Tim Wilmshurst, Palgrave publishers, 2004.
2. The 8051 Microcontroller and Embedded systems – Muhammad Ali Mazidi et al., - Pearson Education – 2nd Edition, 2006.

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Core Course – VII - Compiler Design

Unit I

Introduction on the phase of the complier – Lexical Analysis, Regular Expression,

Non deterministic Automata, Deterministic Automata equivalent to NFA's. Minimizing the states of DFA, Implementation of Lexical Analyzer.

Unit II

Syntax Analysis – Top down Parsing Concepts, Recursive Descent Parsing, Predictive Parsers, Non recursive Predictive Parsing – Bottom Up Parsing, Handle pruning, Shift reduce parsing – Operator Precedence Parsing – Error recovery in Parsing, LR Parsers, Parser Generators – YACC.

Unit III

Intermediate Code Generation: Syntax directed Definitions, Construction of Syntax trees – Top down Translation, Bottom up Evaluation of inherited Attributed, Recursive Evaluators, Assigning Space at Complier Construction time – Type checking – Overloading of functions and operators Polymorphic function.

Unit IV

Storage Organization : Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol tables, Dynamic Storage Allocation, Intermediate Languages – Representation of Declarations, Assignment Statement, Boolean Expression, Back patching, Procedure calls.

Unit V

Code Generation and Optimization: Design of the code generators, Runtime storage Management, Basic blocks and flow graphs, Register Allocation and Assignment, DAG representation of Basic blocks, Peephole optimization, Code optimization – The principle sources of optimization, Optimization of basic blocks, Global data flow Analysis, Loop optimizations.

Text Book(s)

1. Alfred Aho, Ravi Sethi, Jeffy D.Ullman, "Compilers – Principles, Techniques and Tools", 1986, Addison Wesley.

2. Dhamdhere D.M., "Compiler Construction Principles and Practice", 1981, Macmillan India.

References

Reinhard Wilhlm, Director Mauser, "Compiler Design", 1995, Addison Wesley.

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Core Course – VIII - PARALLEL COMPUTING

Unit I

Introduction to Parallel Computing – Motivating Parallelism – Scope of Parallel Computing – parallel programming platforms : Implicit parallelism trend in microprocessor architecture – Limitations of memory system performances – Dichotomy of parallel platforms – Physical organization of platforms Communication cost in parallel machines – Routing mechanism for interconnection networks

Unit II

Principles of parallel algorithm Design – Preliminaries – Decomposition techniques – Characteristics of task and interactions – Mapping techniques for load balancing

Unit III

Methods for containing interaction overhead – Parallel Algorithm models – one –to – All Broadcast and All – to – One Reduction – All – to – All Broadcast and Reduction

Unit IV

Analytical Modeling of Parallel Programs – Sources of overhead in parallel programs – Performance metrics for parallel systems – The effect of Granularity on performances – Scalability of parallel systems – Minimum execution time and minimum cost – optimal execution time – Asymptotic analysis of parallel programs

Unit V

Sorting – Issues in sorting on parallel computers – Sorting Networks – Bubble sort and its variables – Quicksort – Bucket and sample sort – Others sorting algorithms

Text Book:

1. Introduction to Parallel Computing, Second edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Education

References

1. Introduction to Parallel Processing Algorithms and Architecture, Bchrooz Parhami, Plenum Series, 2002

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Core Course– IX - Micro Processors and Interfacing Lab

1. Addition – 8 bit / Multi byte numbers
2. Subtraction – 8 bit / Multi byte numbers
3. Multiplication – 8 bit / Multi byte numbers
4. Division - 8 bit / Multi byte numbers
5. Finding smallest / biggest number in a given list
6. Arranging numbers in ascending / descending order
7. Finding the presence / location of a given number / name in a list
8. Displaying characters in different forms like scrolling, blinking etc.,
9. Study of DAC in volume control
10. Biometric identification like finger print, gas
11. Keyboard interfacing
12. Study of traffic lights model

Elective - I

1. Mobile Computing

Unit I

Introduction: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Telecommunications System: Telecommunication System – GSM – Architecture – Sessions – Protocols – Hand over and Security – UMTS and IMT 2000 – Satellite System

Unit III

Wireless LAN : IEEE S02.11 – Hiper LAN – Bluetooth – MAC Layer – Security and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

Text Book(s)

1. Jochen Schiller, "Mobile Communication", Pearson Education, Delhi, 2000.

References

1. "The Wireless Application Protocol: Writing Applications for the Mobile Internet", Sandeep Singhal, et al.

Elective - I

2. Grid Computing

Unit I

Introduction: Grid Computing & Key Issues – Applications – Other Approaches – Grid Computing Standards – Pragmatic Course of Investigation.

Unit II

Grid Benefits & Status of Technology: Motivations – History of Computing, Communications and Grid Computing – Grid Computing Prime Time – Suppliers and Vendors – Economic Value – Challenges.

Unit III

Components of Grid Computing Systems and Architectures: Basic Constituent Elements-A Functional View – A Physical View – Service View.

Unit IV

Grid Computing Standards-OGSI: Standardization – Architectural Constructs – Practical View – OGSA/OGSI Service Elements and Layered Model – More Detailed View.

Unit V

Standards Supporting Grid Computing-OGSA: Functionality Requirements – OGSA Service Taxonomy – Service Relationships – OGSA Services – Security Considerations.

Text Book(s)

1. A Networking Approach to Grid Computing, Daniel Minoli, Wiley Publication

References

1. Grid Computing – A Practical Guide to Technology and Applications, Ahmar Abbas, Charles River Media Publication.

Semester III
Core Course X - DISTRIBUTED TECHNOLOGY

UNIT I: INTRODUCTION

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware

UNIT II :JAVA BASED COMPONENT TECHNOLOGIES

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

UNIT III: CORBA COMPONENT TECHNOLOGIES

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture

UNIT IV: NET BASED COMPONENT TECHNOLOGIES

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting

UNIT V: COMPONENT FRAMEWORKS AND DEVELOPMENT

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools

TEXT BOOK

1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003

REFERENCES

1. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999.
2. Mowbray, "Inside CORBA", Pearson Education, 2003.
3. Freeze, "Visual Basic Development Guide for COM & COM+", BPB Publication, 2001.
4. Hortsamann, Cornell, "CORE JAVA Vol-II" Sun Press, 2002.Core Course – XI (CC) XML and Web Services.

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Core Course XI - XML AND WEB SERVICES

Unit I

Introduction – What are web services? SOAP WSDL UDDI-Why Web Services are important ? – The evolution of web applications Not just another distributed computing platform – Web services and enterprises.

Unit II

XML Fundamentals XML: The Lingua Franca of web services- XML Documents-XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH

Unit III

SOAP and WSDL5 The SOAP Model- SOAP- SOAP Messages SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults- SOAP encoding – SOAP RPC- Using alternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC and SOAP Document-Literal, SOAP web services and the REST Architecture- Looking back to SOAP 1.1 Syntactic differences between SOAP 1.2 and SOAP 1.1- Changes to SOAP-RPC- SOAP Encoding- WSDL structure, The stock quote WSDL interface, definitions, The type element, bindings, services, managing WSDL descriptions, Extending WSDL – Using SOAP and WSDL

Unit IV

UDDI: UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

Unit V

Transactions ACID Transactions – Distributed Transactions and two phase commit – Dealing with Heuristic outcomes – Scaling transactions to web services – OASIS business transaction protocol – Other web services transaction Protocol Security Everyday security basis – Security is an end to end product – Web service security issues – Types of Security attacks and threats - Web services security road map – WS security

Text Book(s)

Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services - An Architect's Guide" Pearson Education– Second Indian Reprint 2005.

References

Eric Newcomer, Greg Lomow, Understanding SOA with Web Services, , Pearson Education, First Indian Reprint 2005.

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Core Courses XII - DISTRIBUTED TECHNOLOGIES LAB

1) Create a table and insert a few records using Disconnected Access.
2) Develop a project to update and delete few records using Disconnected Access.
3) Develop a project to view the records using GridView, DetailsView, FormView Controls.
4) Develop a project to generate a crystal report from an existing database.
5) Design a web page that makes uses of Ad Rotator Control.
6) Design a web page involving Multi View or Wizard Control.
7) Make use of Image Control involving two hot spots in a web page.
8) Design a simple web site that makes use of Master Pages.
9) Establish the security features in a simple web site with five pages.
10) Use state management concepts in a mobile web application.
11) Develop a web service that has an ASP.NET client.
12) Develop a web service to fetch a data from a table and send it across to the client.

Elective –II

1. WEB TECHNOLOGY

Unit I

History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. Introduction to JAVA Scripts – Object Based Scripting for the web. Structures – Functions – Arrays – Objects.

Unit II

Introduction – Object refers, Collectors all and Children. Dynamic style, Dynamic position, frames, navigator, Event Model – On check – On load – Onenor – Mouse rel – Form process – Event Bubblers – Filters – Transport with the Filter – Creating Images – Adding shadows – Creating Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.

Unit III

Audio and video speech synthesis and recognition - Electronic Commerce – E- usiness Model – E- Marketing – Online Payments and Security – Web Servers – HTTP request types – System Architecture – Client Side Scripting and Server side Scripting – Accessing Web servers – IIS – Apache web server.

Unit IV

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods.

Unit V

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.

Text book:

Deitel & Deitel, Goldberg, "Internet and world wide web – How to Program", Pearson Education Asia, 2001.

Reference books:

Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India – QUE, 1999.
Aferganatel, "Web Programming: Desktop Management", PHI, 2004.
3. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.

Elective –II

2. DATA MINING AND DATA WAREHOUSING

Unit I

Introduction: Data mining-motivation, importance-DM Functionalities, Basic Data Mining Tasks, DM Vs KDD,DM Metrics, DM Applications, Social implications.

Unit II

Data Warehousing: Difference between Operational Database and Data warehouse-Multidimensional Data Model: From tables to data Cubes, Schemas, Measures-DW Architecture: Steps for design and construction of DW, 3-tier DW Architecture-DW Implementation: Efficient computation of DATA Cubes, Efficient Processing of OLAP queries, Metadata repository.

Unit III

Data Preprocessing: Data Mining Primitives, Languages: Data cleaning, Data Integration and Transformation, Data Reduction. Discretization and concept Hierarchy Generation. Task-relevant data, Background Knowledge, Presentation and Visualization of Discovered Patterns. Data Mining Query Language-other languages for data mining.

Unit IV

Data Mining Algorithms: Association Rule Mining: MBA Analysis, The Apriori Algorithm, Improving the efficiency of Apriori. Mining Multidimensional Association rules from RDBMS and DXV. Classification and Predication: Decision Tree, Bayesian Classification back propagation, Cluster Analysis: Partitioning Methods, Hierarchical Method, Grid-based methods, Outlier Analysis.

Unit V

Web, Temporal And Spatial Data Mining: Web content Mining, Web Structure Mining, Web usage mining. Spatial Mining: Spatial DM primitives, Generalization and Specialization, Spatial rules, spatial classification and clustering algorithms. Temporal Mining: Modeling Temporal Events, Times series, Pattern Detection, Sequences.

Text Book(s)

1. Jiawei Han & Micheline Kamber, "Data Mining: Concepts and Techniques". Harcourt India Private Limited, First Indian Reprint, 2001
2. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, First Indian Reprint, 2003
3. Arun K. Pujari, "Data Mining Techniques", University Press (India) Limited, First Edition,2001
4. Efrem O. Mallach,"Decision Support and Data Warehouse Systems", McGraw-Hill International Edition, 2000

Elective –II

3. PATTERN RECOGNITION

Unit I

Introduction and Bayerian Decision Theory-Introduction to pattern recognition, Systems, design cycles, learning and adoptation,Bayerian decision theory, minimum error-rate classification, classifiers, discriminant functions and decisions surfaces.

Unit II

Maximum – Likelihood and bayerian parameter estimation - Maximum – Likelihood estimation, bayerian estimation, bayerian parameter estimation, Guarian case and general theory, problems of dimeusability, Hidden marker models.

Unit III

Nonparameter Techniques - Density estimation, parazen windows, Kn – Nearest neighbour, estimation, The nearest neghlaur, rode, metris and nearest – neghron, classification, fuzzy classification, approximation by series expansions.

Unit IV

Linear Discriminant functions - Linear discriminant functions and decision surfaces, generadized linear discrminant functions, The two category unicorly separate case, minimizing the perception criterion function, relaxation procedures, nonrepersable behaviour, Minimum squared-error procedures, The Ho – Kashyap Procedures, support vexter machines, multicategory generatization.

Unit V

Multilayer Neural Networks - Feed forward operations and classifications, back propagation algorithm, error factors, back propagation as feature & mapping, back propagation, bayer theory and probability, practical techniques for improving back propagation, regularization, complexity adjustment and pruning.

Text / Reference Books:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification” 2nd Edition, John Wiley
2. John Hertz, Andres Krogh & Richard G. Palmer, “Introduction to the theory of Neural Computation”, Addison Wesley

Elective –II

4. Real Time Operating Systems (RTOS)

Unit I

Introduction, Real-time Versus Conventional Software, Computer Hardware for Monitoring and Control, Software Engineering Issues. Process and State-based Systems model, Periodic and Sporadic Process, Cyclic Executives, CE definitions and Properties, Foreground-Background Organiazations, Standard OS and Concurrency – Architectures, Systems Objects and Object-Oriented Structures, Abstract Data Types, General Object Classes

Unit II

Requirements and Design Specifications: Classification of Notations, Data Flow Diagrams, Tabular Languages, State Machine, Communicating Real Time State Machine- Basic features, Timing and clocks, Semantics Tools and Extensions, State charts - Concepts and Graphical Syntax, Semantics and Tools. Declarative Specifications: Regular Expressions and Extensions, Traditional Logics - Propositional Logic, Predicates, Temporal logic, Real time Logic

Unit III

Deterministic Scheduling : Assumptions and Candidate Algorithms, Basic RM and EDF. Results, Process Interactions-Priority Inversion and Inheritance Execution Time Prediction: Measurement of Software by software, Program Analysis with Timing Schema, Schema Concepts, Basic Blocks, Statements and Control, Schema. Practice, Prediction by optimisation, System Interference and Architectural Complexities

Unit IV

Timer Application, Properties of Real and ideal clocks, Clock Servers – Lamport's Logical clocks, Monotonic Clock service, A software Clock server, Clock Synchronization- Centralized Synchronization, Distributed Synchronization. Programming Languages: Real Time Language Features, Ada-Core Language, Annex Mechanism for Real Time Programming, Ada and Software Fault Tolerance, Java and Real-time Extensions, CSP and Occam

Unit V

Operating Systems: Real Time Functions and Sevices, OS Architectures-Real Time UNIX and POSIX, Issues in Task management- Processes and Threads, Scheduling, Synchronization and communication

Text book:

1. Real – Time Systems and software by Alan C. Shaw ; John Wiley & Sons Inc,2002

ELECTIVE – III

1. REAL TIME AND EMBEDDED SYSTEM

Unit I

INTRODUCTION: Introduction to Embedded systems – Processor and memory organization-Devices and buses for Device Networks – Device drivers and Interrupt servicing mechanism.

Unit II

RTOS : RTOS – Programming tools – Case studies- Hardware- software Co0design in an Embedded system

Unit III

REAL TIME SYSTEMS : Basic Real time concepts – Computer hardware – Language issues – Software life Cycle

Unit IV

REAL TIME SPECIFICATIONS: Design techniques – Real-time kernels – Intertask communication and synchronization – Real –time memory management

Unit V

MULTIPROCESSING SYSTEMS : Multiprocessing Systems - Hardware/Software integration- Real time Applications

Text Book(s)

1. Raj Kamal, 'Embedded Systems Architecture, Programming and Design', Tata Mc-Graw-Hill,2003
2. Phillip A.Laplante, "Real –Time Systems Design and Analysis, An Engineer's Handbook", Prentice-Hall of India,2002

References

1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems: Design to networking with C/C++", Prentice- Hall, International, 1999.
2. Grehan Moore and Cyliax, "Real Time Programming: A guide to 32 Bit Embedded Development Reading: Addison- Wisley-Longman", 1998.
3. Haeth, Steve, "Embedded systems Design", Newnes,1997.

Elective –III

2. NETWORK SECURITY

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book(s)

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003

References

1. Johannes A. Buchaman , Introduction to cryptography, Springer-Verlag.

2. Atul kahate , Cryptography and Network Security, TMH.

Elective –III

3. GENETIC ALGORITHM

Unit I

Basics of biological evolution - Darwin, DNA, etc. Basics of Gas – selection, recombination and mutation - Choices of algorithm: (mu,lambda) - (mu+lambda), steady-state, CHC, etc. Linkage and epistasis. The standard test functions. Fitness and objective functions: scaling, windowing etc. Representational issues: binary, integer and real-valued encodings; permutation-based encodings. Operator issues: different types of crossover and mutation, of selection and replacement. Inversion and other operators.

Unit II

Constraint satisfaction: penalty-function and other methods; repair and write-back; feasibility issues. Experimental issues: design and analysis of sets of experiments by t-tests, F-tests, bootstrap tests etc.Some theory: the schema theorem and its flaws; selection takeover times; optimal mutation rates; other approaches to providing a theoretical basis for studying GA issues.Rival methods: hill-climbing, simulated annealing, population-based incremental learning, tabu search, etc. Hybrid/memetic algorithms.

Unit III

Multiple-solutions methods: crowding, niching; island and cellular models. Multi-objective methods: Pareto optimisation; dominance selection; VEGA; COMOGA.

Unit IV

Genetic programming: functions and terminals, S-expressions; parsimony; fitness issues; ADFs. Evolving rules and rule-sets. SAMUEL and related methods. Classifier systems: the Pittsburgh and Michigan approaches. Credit allocation: bucket-brigade and profit-sharing. Hierarchic classifier systems.

Unit V

Genetic planning: evolving plans, evolving heuristics, evolving planners, optimising plans. Ant Colony Optimization: Basic method for the TSP, local search, application to bin packing.Applications: engineering optimisation; scheduling and timetabling; data-mining; neural net design; etc. Some further ideas: co-evolution; evolvable hardware; multi-level Gas; polyploid GAs.

Text/References Books:

1.M. Mitchell: An Introduction to Genetic Algorithms. MIT Press, 1996.
2.W. Banzhaf, P. Nordin, R. E. Keller, F. D. Francone: Genetic Programming: An Introduction. Morgan Kaufmann, 1998.
3.E. Bonabeau, M. Dorigo, G. Theraulez: Swarm Intelligence: From Natural to Artificial Systems. Oxford University Press, 1999

Elective –III

4. DIGITAL ASSET MANAGEMENT

Unit I

Creating Digital Content - Digital Primer, Any Content – Anywhere, Anytime, Digital Content Consumer, Tools And The Trade, Digital Recording, CGI And Digital Content Creation, Digital Audio, Rich Media, Streaming Media, Digital Interactive Television, Digital Cinema.

Unit II

Compressing And Indexing - Document Databases, Compression, Indexes, Text Compression, Indexing Techniques, Image Compression, Mixed Text And Images.

Unit III

Content Management - Systems For Managing Content, The Enterprise Content Management System (CMS), Major Parts Of A CMS, Need For A CMS, Roots Of Content Management, Branches Of Content Management.

Unit IV

Design Of CMS - The Wheel Of CMS, Working With Metadata, Cataloging Audiences, Designing Publications, Designing Content Components, Accounting For Authors, Accounting For Acquisition Sources.

Unit V

Building CMS - Content Markup Languages, XML And Content Management, Processing Content.

Textbook:

- John Rice And Brian Mckerman (Editors), Peter Bergman, "Creating Digital Content", Mcgraw-Hill, USA, 2001[Unit 1]
- Ian H Witten, Alistair Moffat, Timothy C Bell, "Managing Gigabytes", Academic Press, USA, 1999 [Unit 2]
- Bob Boiko, "Content Management Bible", John Wiley & Sons, USA, 2001 [Units 3,4,5]
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Reference book:

- Abdreas Ulrich Mauthe And Peter Thomas, "Professional Content Management Systems – Handling Digital Media Assets", John Wiley & Sons, USA, 2004
- Dave Addey, James Ellis, Phil Suh, David Thiemecke, "Content Management Systems (Tool Of The Trade)", Apress, USA, 2003.

SEMESTER IV
Core Course – XIII - Computer Graphics

Unit I
A survey of computer graphics – Overview of Graphic systems - Output primitive (Mathematical functions for creating graphic outputs) – setting attribute of Output primitives

Unit II
Two dimensional geometric transformations – Two dimensional viewing

Unit III
Graphic structures – Hierarchical modeling – Graphical user interfaces and interactive input methods

Unit IV
3D Concepts – 3D Object Representation – 3D Geometric and Modeling Transformations

Unit V
Visible surface detection methods - Illumination models – Computer Animation

Text Book:
1. Hearn Donald, Baker Paulin M., Computer graphics – C version, Second edition, Pearson education, 2006. (ISBN 81-7758-765-X)

References:
1. Newman William M., & Sproull Robert F. , Principles of interactive computer graphics, Second edition, Tata –McGraw Hill, 1 (ISBN 0-07-463293-0)

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Core Course – XIV - OPEN SOURCE LAB

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a mysql table.
4. Write a PHP program interface to create a database and to insert a table into it.
   i). Write a PHP program using classes to create a table.
   ii). Write a PHP program to upload a file to the server.
5. Write a PHP program to create a directory, and to read contents from the directory.
6. Write a shell program to find the details of an user session.
7. Write a shell program to change the extension of a given file.
8.. Create a mysql table and execute queries to read, add, remove and modify a record from that table.

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ELECTIVE – IV – 1. OPEN SOURCE TECHNOLOGIES

UNIT I: OPEN SOURCE

Introduction : Open Source – Open Source vs. Commercial Software – What is Linux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions

UNIT II: LINUX

Introduction: Linux Essential Commands - Filesystem Concept - Standard Files - The Linux Security Model - Vi Editor - Partitions creation - Shell Introduction - String Processing - Investigating and Managing Processes - Network Clients - Installing Application

UNIT III: APACHE

Introduction - Apache Explained - Starting, Stopping, and Restarting Apache - Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Don't Allow public_html Web sites - Apache control with .htaccess

UNIT IV: MySQL

Introduction to MY SQL - The Show Databases and Table - The USE command - Create Database and Tables - Describe Table - Select, Insert, Update, and Delete statement - Some Administrative detail - Table Joins - Loading and Dumping a Database.

UNIT V: PHP

PHP Introduction- General Syntactic Characteristics - PHP Scripting - Commenting your code - Primitives, Operations and Expressions - PHP Variables - Operations and Expressions Control Statement - Array - Functions - Basic Form Processing - File and Folder Access - Cookies - Sessions - Database Access with PHP - MySQL - MySQL Functions - Inserting Records - Selecting Records - Deleting Records - Update Records.

Text Book

1. "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", James Lee and Brent Ware, Dorling Kindersley(India) Pvt. Ltd, 2008

Reference books

1. "Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together", Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004

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ELECTIVE – IV - **Digital Image Processing**

Unit I :

CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS :Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Image Processing Problems and Applications, Vision Camera, Digital Processing System, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd Max Quantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, ZTransform, Matrix Theory Results, Block Matrices and Kronecker Products.

Unit II :

IMAGE TRANSFORMS : 2-D orthogonal and Unitary transforms, 1-D and 2-D DFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, Singular value Decomposition transforms.

Unit III :

IMAGE ENHANCEMENT : Point operations - contrast stretching, clipping and thresholding density slicing, Histogram equalization, modification and specification, spatial operations - spatial averaging, low pass, high pass, band pass filtering, direction smoothing, medium filtering, generalized cepstrum and homomorphic filtering, edge enhancement using 2-D IIR and FIR filters, color image enhancement.

Unit IV :

IMAGE RESTORATION :Image observation models, sources of degradation, inverse and Wiener filtering, geometric mean filter, non linear filters, smoothing splines and interpolation, constrained least squares restoration.

Unit V :

IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS Image data rates, pixel coding, predictive techniques transform coding and vector DPCM, Block truncation coding, wavelet transform coding of images, color image coding. Random transform, back projection operator, inverse random transform, back projection algorithm, fan beam and algebraic restoration techniques.

Book for study :

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 1995.

2. Sid Ahmed M.A., “Image Processing”, McGraw Hill Inc, 1995.

3. Gonzalaz R. and Wintz P., “Digital Image Processing”, Addison Wesley, 2nd Ed, 1987.

ELECTIVE – IV - 3. ARTIFICIAL NEURAL NETWORKS

Unit I

BASICS OF ARTIFICIAL NEURAL NETWORKS : Characteristics of Neural Networks – Historical development of Neural Network principles – Artificial Neural Networks: Terminology – Models of Neuron – Topology – Basic Learning Laws.

Unit II

ACTIVATION AND SYNAPTIC DYNAMICS : Introduction – Activation Dynamic Models – Synaptic Dynamic Model – Learning Models – Learning Methods.

Unit III

FUNCTIONAL UNITS OF ANN FOR PATTERN RECOGNITION TASKS : Pattern Recognition Problem – Basic Functional Units – Pattern Recognition Tasks by the Functional Units – FEED FORWARD NEURAL NETWORKS: Introduction – Analysis of Pattern Association Networks – Analysis of Pattern classification Networks – Analysis of Pattern Mapping Networks.

Unit IV

FEEDBACK NEURAL NETWORKS : Introduction – Analysis of Linear Auto Associative FF Networks – Analysis of Pattern Storage Networks. COMPETITIVE LEARNING NEURAL NETWORKS : Introduction – Components of a Competitive Learning Network – Analysis of Feed back Layer for Different Output Functions – Analysis of Pattern Clustering Networks – Analysis of Feed Mapping Network.

Unit V

APPLICATIONS OF NEURAL SYSTEMS : Applications of Neural Algorithms and Systems character Recognition – Expert Systems Applications – Neural Network Control Applications, Spatio – Temporal Pattern Recognition – Neocognitron and other Applications.

Text Books:

1. For Units I to IV : "ARTIFICIAL NEURAL NETWORKS", B.YEGNANARAYANAN,Eastern Economy edition – Chapter 1, 2.
2. For Unit – V: "INTRODUCTION TO ARTIFICIAL NEURAL SYSTEMS" JACEK M.ZURADA (1994) – Jaico Publishing House.

Reference Books:

"Introduction to the theory of Neural Computation", - J.Hertz, A.Krogh., and R.G. Palmer, Addison – Wesley 1991

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ELECTIVE – IV - 4. BIOINFORMATICS

Unit I

Molecular Biology, Gene Structure and Information Content, Molecular Biology Tools,

Genomic Information Content, Data Searches and Pairwise Alignments, Gaps, Scoring Matrices, Needleman and Wunsch Algorithm, Global and Local Alignments, Database Searches.

Unit II

Patterns of Substitution Within Genes, Estimating Substitution Numbers, Molecular Clocks, Molecular Phylogenetics, Phylogenetic Trees, Distance Matrix Methods.

Unit III

Character-Based Methods Of Phylogenetics, Parsimony, Ancestral Sequences, Searches, Consensus Trees, Tree Confidence, Genomics, Prokaryotic Gene Structure, Gene Density, Eukariotic Genomes, Gene Expression.

Unit IV

Protein and Rna Structure Prediction, Polypeptic Composition, Secondary and Tertiary Structure, Algorithms For Modeling Protein Folding, Structure Prediction

Unit V

Proteomics, Protein Classification, Experimental Techniques, Ligand Screening, Post-Translational Modification Prediction.

Text Book:

"Fundamental Concepts of Bioinformatics" - D. E. Krane and M. L. Raymer - Pearson Education - 2003.

.References Book:

1."Introduction to Bioinformatics" - T. K. Attwood and D. J. Parry-Smith - Pearson Education - 2007.
2. “Biostatistical Analysis” - J. H. Zar - Fourth Edition - Pearson Education - 1999 (Fifth Edition about to be released in 2010).

ELECTIVE – V -1. PERVASIVE COMPUTING

Unit I

Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

Unit II

Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

Unit III

Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

Unit IV

WAP and Beyond: Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition- Voice Standards-Speech applications-Speech and Pervasive Computing

Unit V

PDA: Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of Pervasive Computing web applications-Pervasive application architecture

Text Book(s)

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006

References

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006

ELECTIVE–V- 2. SOFTWARE QUALITY ASSURANCE AND TESTING

Unit I

Principles of Testing – Software Development Life Cycle Models

Unit II

White Box Testing-Integration Testing-System and acceptance testing.

Unit III

Testing Fundamentals -2 & Specialized Testing: Performance Testing-Regression testing-Testing of Object Oriented Systems-Usability and Accessibility Testing.

Unit IV

Test Planning, Management, Execution and Reporting.

Unit V

Software Test Automation-Test Metrics and Measurements

Text Book(s)

1. Software Testing -Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education 2006.

References

1. Introducing Software testing-Louis Tamres, Addison Wesley Publications, First Edition.
2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition 2001.
3. Software Quality-Producing Practical, Consistent Software-Mordechai Ben-Menachem, Gary S Marliss, Thomson Learning, 2003.

ELECTIVE – V - 3. ROBOTICS

Unit I

Fundamentals of robot Technology : Robot anatomy. Work volume. Drive systems. Control - Systems and dynamic performance - Accuracy and repeatability - Sensors in robotics – Robot reference frames and coordinates and robot kinematics.

Unit II

Robot kinematics : Matrix representation - Homogeneous transformations - Forward and inverse kinematics - Robot dynamics - Differential motions of a frame - Jacobian static force analysis.

Unit III

Configuration of a robot controller : End effectors - Mechanical and other types of grippers - Tools as end effectors - Robot and effector interface - Gripper selection and design - Introduction to robot languages.

Unit IV

Applications for manufacturing - Flexible automation - Robot cell layouts – Machine interference - Other considerations in work cell design - Work cell control – Interlocks – Robot cycle time analysis.

Unit V

Simulation of robotic work cells - Typical applications of robots in material transfer, machine loading/unloading; processing operations; assembly and inspection.

Text Book:

1.“Introduction to Robotics analysis, Systems & Applications” - Saeed B. Niku - Pearson Education Singapore P. Ltd., 2002.
2.“Robotic Technology and Flexible Automation” - S.R. Deb, Tata McGraw Hill Publishing Co. Ltd., 2003.
4.“Robotics & Control”- R.K. Mittal,I.J. Nagrath - Tata McGraw & Hill, 2005.

.References Book:

1."Fundamentals of Robotics, analysis & Control" Robert J. Schilling, Prentice Hall of India P.Ltd., 2002.

ELECTIVE – V - 4. SOFTWARE PROJECT MANAGEMENT

Unit I

SOFTWARE MANAGEMENT RENAISSANCE: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – The Old Way and the New.

Unit II

A SOFTWARE MANAGEMENT PROCESS FRAMEWORK: Live-Cycle Phases – Artifacts of the Process – Model-Based Software Architectures – Work Flows of the Process – Check Points of the Process.

Unit III

SOFTWARE MANAGEMENT DISCIPLINES – I: Iterative Process Planning – Project Organizations and Responsibilities – Process Automation.

Unit IV

SOFTWARE MANAGEMENT DISCIPLINES – II: Project Control and Process Instrumentation – Tailoring the Process

Unit V

RISK MANAGEMENT: Introduction – Risk – Categories of risk – A framework for dealing with risk – Risk Identification – Risk assessment – Risk Planning – Risk Management – Evaluating risks to schedule – Applying the PERT Technique – Monte Carlo Simulation – Critical Chain Concepts

Text Book:

1. "Software Project Management" - Walker Royce - Pearson Education
2. "Software Project Management" - Bob Hughes & Mike Cotterell - Fourth Edition - 2008 - ISBN: 978 - 0 - 07 - 061985-2

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