

**GOVERNMENT COLLEGE FOR WOMEN (AUTONOMOUS)
KUMBAKONAM**

M.Sc., Computer Science - Course structure under CBCS

(For the candidates to be admitted from the year June 2015-2016 onwards)

SEMESTER	COURSE TITLE	In Hours	CREDIT	Marks		TOTAL
				Int	Ext	
I	CC I - Mathematical Foundations	5	4	25	75	100
	CC II - OOAD & UML	5	4	25	75	100
	CC III - Advanced Java Programming	5	4	25	75	100
	CC IV - Distributed Operating System	5	4	25	75	100
	CC V - Advanced Computer Architecture	5	4	25	75	100
	CC VI- Advanced Java Programming Lab	5	4	40	60	100
	TOTAL	30	24	-	-	600
II	CC VII- Microprocessors and Microcontrollers	5	4	25	75	100
	CC VIII- Compiler Design	5	4	25	75	100
	CC IX- Programming in C# and .NET Framework	5	4	25	75	100
	CC X - Programming in .Net Lab	5	4	40	60	100
	EC- I Any one from the given list	5	4	25	75	100
	EC -II Any one from the given list	5	4	25	75	100
	TOTAL	30	24			600
III	CC XI - Data Mining	5	4	25	75	100
	CC XII - Cloud Computing	5	4	25	75	100
	CC XIII - Open Source Lab	5	4	40	60	100
	CC XIV -Web Technology Lab	5	4	40	60	100
	EC -III Any one from the given list	5	4	25	75	100
	EC -IV Any one from the given list	5	4	25	75	100
	TOTAL	30	24	-	-	600
IV	EC -V Any one from the given list	5	4	25	75	100
	Major Project Dissertation = 100 Marks [2 reviews = 20+20 marks Report Valuation = 40 marks] Viva = 20 Marks	25	14	-	-	200
GRAND TOTAL		-	90	-	-	2100

Total Hours : 120

Credit : 90

Marks : 2100

Recommended credits distribution: (Total should not be less than 90 credits)

Course Type	Course	Credits	Total Credits
Core(Theory)	10	4	40
Core(Practical)	4	4	16
Core(Major Project)	1	4	14
Elective	5	4	20
Total	20		90

List of Elective Courses (For 2014-2015)

Sl.No	Title of the Paper
1	Mobile Communications
2	Soft Computing

Elective I

Sl.No	Title of the Paper
1	Software Project Management
2	Network Security
3	Genetic Algorithms

Elective II

Sl.No	Title of the Paper
1	Web Technology
2	Grid Computing
3	Digital Image Processing

Elective III

Sl.No	Title of the Paper
1	Open Source Technologies
2	Artificial Neural Networks
3	Robotics

Elective IV

Sl.No	Title of the Paper
1	Software Quality Assurance and Testing
2	Pervasive Computing
3	Pattern Recognition

Elective V

GOVERNMENT COLLEGE FOR WOMEN (AUTONOMOUS)
KUMBAKONAM

Department of Computer Science

M.Sc COMPUTER SCIENCE PG-SYLLABUS

(2015 Onwards)



2014-2015

Semester I
Core Paper I - MATHEMATICAL FOUNDATIONS

UNIT-I : Mathematical Logic - Introduction-Statements and Notations – Connectives - Negation - Conjunction - Disjunction - Statement Formulas and Truth Tables – Logical Capabilities of Programming Languages - Conditional and Biconditional - Well-Formed Formulas Tautologies - Equivalence of Formulas - Duality Law - Tautological Implications - Formulas With Distinct Truth Table - Functionality Complete Sets of Connectives - Two-State Devices and Statement Logic - Normal Forms - Disjunctive Normal Forms - Conjunctive Normal Forms-Principle Disjunctive Normal Form-Principle Conjunctive Normal Forms-Ordering and Uniqueness of Normal Forms- Completely Parenthesized Infix Notation and Polish Notation – The theory of inference for the statement calculus – validity using truth tables- rules of inference – consistency of premises and indirect method of proof – automatic theorem proving.

UNIT-II : Set Theory-Introduction-Basic Concepts of Set Theory-Notation-Inclusion and Equality of Sets-The Power Set-Some Operations on Sets-Venn Diagrams-Some Basic Set Identities-The Principle of Specification-Ordered Pairs-and n-tuples-Cartesian Products-Representation of Discrete Structures-Data Structures-Storage Structures-Sequential Allocation-Pointers and Linked Allocation An Application of Bit Represented Sets.

UNIT-III: Relations and ordering-Relations-Properties of Binary Relations In a Set-Relation Matrix and The Graph of a Relation-Partition and Covering of a Set-Equivalence Relations – Compatibility Relations-Composition of Binary Relations Partial Ordering-Partially Ordered Set: Representation and Associated Terminology-Functions-Definition and Introduction-Composition of Functions-Inverse functions - Binary and n-ary Operation-Characteristics Function of a Set Hashing Functions

UNIT-IV: Introduction: What is Graph-Application of Graph-Finite and Infinite Graph-Incidence and Degree-Isolated Vertex,Pendant Vertex,and Null Graph-Isomorphism-Subgraphs-Walks,Pathsand Circuit-Operation of Graphs-Trees-Some Properties Of Trees-Pendant Vertices in a Tree.

UNIT-V: Cut Sets-Fundamental Circuitsand Cut Sets-Incidence Matrix-Circuit Matrix-Cut-Set Matrix- Path Matrix-Adjacency Matrix.

Text Book :

For unit I,II,III: Discrete Mathematical Structures With Applications to Computer Science.-
J.P.Tremblay ,R.Manohar
For unit IV,V :Graph Theory-Narsingh Deo.

Reference :

1."Discrete Mathematics ",Seymour Lipschutz and Mare Laris Lipson,m2nd Edn., Schaum's outline by Tata Mc GrawHill Publishing Company Ltd,New Delhi 1999.
2.Introductory Mathematical Statistics", Erwin Kryszig,Zohn Wiley and sons,New Yark,1990.

Semester I

Core Paper II – OOAD & UML

Unit I

An overview of object oriented systems development & Life cycle. Various object oriented methodologies

Unit II

Object oriented analysis – Use cases – Object Classification, relationships, attributes, methods.

Unit III

The Importance of modeling-Principles of modeling-Object Oriented modeling-Overview of the UML-A Conceptual Model of the UML-Architecture-Software Development Life Cycle-Basic Structural Modeling-Classes-Relationships-Common mechanisms-Diagrams-Class diagrams.

Unit IV

Basic Behavioral Modeling-Advanced Behavioral Modeling-Events and signals-state machines-Processes and Threads-State chart diagrams.

Unit IV

Architectural Modeling-Components-Deployment-Collaborations-Patterns and Frameworks-Component Diagrams-Deployment Diagrams-Systems and Models.

Text Book(s)

1. **Bahrami Ali**, “**Object oriented systems development**”, **Irwin McGrawHill**, **2005**

(First 2 Units covered here).

Unit-I: Chapter 1,2,3. Unit-II:Chapter-6,7,8

2.**Booch Grady, Rumbaugh James, Jacobson Ivar**, “**The Unified modeling language**” – user Guide, Pearson education , 2006 (ISBN 81-7758-372-7)(UNIT – 3,4,5 covered here).

Unit-III:Section1-(Chapter-1,2,3), Section2-(Chapter-4,5,6,7,8).

Unit-IV:Section 4-(Chapter-15,16,17,18,19), Section5-(Chapter-20,21,22,24).

Unit-V:Section6(Chapter-25,26,27,28,29,30,31)

Semester I

Core Paper III – ADVANCED JAVA PROGRAMMING

Unit I

JDBC: Java API for Database Connectivity: Introduction to JDBC – Connecting to a Remote Database – Performing Database Queries and Updates – The JDBC API – Advanced Techniques. **Networking:** Networking Basics – Java and the Net - InetAddress – TCP/IP client sockets– URL – URL Connection – – TCP/IP Server sockets – A Caching Proxy HTTP Server - Datagrams – Inet4Address and Inet6Address – The URI Class

Unit II

The Applet Class: Applet Basics – Applet Architecture – An Applet Skeleton – Simple Applet Display Methods – Requesting Repainting – Using the Status Window – HTML Applet Tag – Passing Parameters to Applet – getDocumentBase() and getCodeBase() – AppletContext and showDocument() – AudioClip Interface – AppletStub Interface – Outputting to the Console. **Event Handling:** Two Event Handling Mechanisms – The Delegation Event Model – Event Classes – Sources of Event – Event Listener Interface – Using the Delegation Event Model – Adapter Classes – Inner Class

Unit III

Images: File Formats – Image Fundamentals – ImageObserver – Double Buffering – Media Tracker – ImageProducer – ImageConsumer – ImageFilter – Cell Animation – Additional Imaging Classes. **New I/O, Regular Expressions, and Other Packages:** The Core Java API Packages – New I/O Packages – Regular Expression Processing – Reflection – RMI – Text Formatting

Unit IV

Java Beans: What is a Java Bean? – Advantages of Java Beans – Application Builder Tools – Using the Bean Developer Kit – JAR Files – Introspection – Developing a Simple Bean Using the BDK – Using Bound Properties – Using the BeanInfo Interface – Constrained Properties – Persistence – Customizers – The Java Bean API – Using Bean Builder. **A Tour of Swing:** JApplet – Icons and Labels – Text Fields – Buttons – Combo Boxes – Tabbed Panes – Scroll Panes – Trees – Tables – Exploring Swing

Unit V

Servlets: Background – The Life Cycle of a Servlet – Using Tomcat For Servlet Development – A simple Servlet – The Servlet API – The javax.servlet Package – Reading Servlet Parameters – The javax.servlet.http Package – Handling HTTP Requests and Responses – Using Cookies – Session Tracking – Security Issues

Text Book(s):

1. “Java 2 Programming Bible”, Aaron Walsh, Justin Couch and Daniel H. Steinberg – IDG Books India(P) Ltd, First Edition 2000 (Unit I: Chapter – 16)
2. “ The Complete Reference : Java 2”, Herbert Schildt , Tata McGraw Hill, 2002. (Chapter – 18,19,20,23,24,25,26,27)

References

1. Deitel & Deitel, “Java How to Program”, Prentice Hall, 5th Edition, 2002.
2. Peter Hagggar, “Practical java: Programming Language Guide”, Addison – Wesley Pub Co, 1st Edition, 2000.
3. Bruce Eckel, “Thinking in Java”, Pearson Education Asia, 2nd Edition, 2000.

Semester I

Core Paper IV – DISTRIBUTED OPERATING SYSTEM

UNIT I:

Distributed Computing Systems:

Evolution – Models – Distributed Operating System – Issues in designing DOS – Distributed Computing environment

UNIT II:

Communication in Distributed System:

Protocols – Features of a Good Message Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Process addressing – Failure handling – Group Communication

Synchronization:

Clock Synchronization – Event ordering – Mutual Exclusion – Deadlock .

UNIT III:

Security: Potential Attacks to Computer systems – Cryptography – Authentication – Access control – Digital Signatures – Design Principles

UNIT IV:

File System Structure:

History – System structure – User perspective

Internal Representation of files:

Inodes – Structure of a regular file – Directories – Conversion of a path to an inode – Super block – Inode Assignment to a new file – Allocation of Disk blocks

System Calls for the file system:

Open – Read – Write – Close – File creation – Creation of special files – Change Directory, root owner and mode – stat and fstat - pipes – dup – mounting and unmounting file systems – link and unlink

UNIT V:

Interprocess Communication:

Process tracing – System V IPC – Sockets

Multiprocessor Systems:

Problem of multiprocessor systems – solution with master and slave processors – solution with semaphores

Text Book:

1. For units 1,2, and 3: Pradeep K. Sinha, “Distributed System Concepts and Design”, PHI Pvt. Ltd, 1998
2. For units 4 and 5: Marice J Bach, “The Design of UNIX OS”,

Reference Book:

1. Andrew S. Tanenbaum, “Modern Operating Systems”
2. W. Richard Stevens, “UNIX Network Programming”

Semester I

Core Paper V – ADVANCED COMPUTER ARCHITECTURE

UNIT I: Parallel Computer Models – The state of Computing- Multiprocessors and Multicomputers-Multivector and SIMD computers-PRAM and VLSI Models.

UNIT II : Program and Network Properties : Conditions of Parallelism-Program Partitioning and Scheduling – Program Flow Mechanisms – System Interconnect Architectures – Principles of Scalable Performance – Performance Metrics and Measures- Speedup Performance Laws-Scalability Analysis and Approaches : Scalability Metrics and Goals.

UNIT III : Processors and Memory Hierarchy – Advanced Processor Technology- Superscalar and Vector Processors – Memory Hierarchy Technology – Virtual Memory Technology.

UNIT IV : Bus, Cache, and Shared Memory – Backplane Bus systems-Cache Memory Organizations –Shared Memory Organizations-Sequential and Weak Consistency Models.

UNIT V : Pipelining and Superscalar Techniques –Linear Pipeline Processors- Nonlinear Pipeline Processors-Instruction Pipeline Design-Arithmetic Pipeline Design - Superscalar and Superpipeline Design.

Text Book : “Advanced Computer Architecture”- Parallelism, Scalability, Programmability – Kai Hwang-Tata McGraw-Hill-Edition 2001.

Reference Book : D.A.PATTERSON,J.L.HENNESSY – “Computer Architecture : A Quantitative Approach “, Harcourt Asia, Morgan Kaufmann, 1999.

Semester I

Core Paper VI – ADVANCED JAVA PROGRAMMING LAB

List of exercises for practical Laboratory

1. 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.
2. Create a Japplet using swing control, which will create the layout shown below and handle necessary events.

Format

Enter your Name:
Enter your Age:
Select your s/w:* Oracle *Visual Basic
*Java
Select your city:*Delhi *Mumbai
*Chennai
Ok Cancel

3. Use JDBC Connectivity and create Table, insert and update data.
4. Write a program in Java to implement a Client/ Server application using RMI.
5. Write a program in Java to create a Cookie and set the expiry time of the same.
6. Write a program in Java to create Servlet to count the number of visitors to a web page.
7. Write a program in Java to create a form and validate a password using Servlet.
8. Develop a Java Bean to demonstrate the use of the same.
9. Write a program in Java to convert an image in RGB to a Grayscale image.
10. Develop Chat Server using Java.

Semester II

Core Paper VII – MICROPROCESSOR AND MICROCONTROLLERS

Unit I: 8086 Software Aspects

8086 Software Aspects: Intel 8086 Microprocessors – Architecture – Pin Details of 8086 – Addressing modes in 8086 – Instruction set of 8086 - Assembly language programming – Linking and relocation – stacks – procedures – Macros – Interrupts and Interrupt Routines – Byte & String Manipulation - 8086 System Design: Basic Configuration – System Bus timing.

Unit II: I/O Interfaces

I/O Interfaces: Serial communication Interface – Parallel communication Interface – Programmable Timer – Keyboard and Display Controller – DMA Controller – Interrupt Controller.

Unit III: Advanced Processors

Advanced Processors: Intel 80x86 family of processors – Salient features of 80286, 80386, Basic 486 Architecture: 486 memory system and memory management – Features of Pentium memory Pentium memory and I/O systems – Pentium memory management – Introduction to Pentium Pro features.

Unit IV: 8051 Microcontrollers

8051 Microcontrollers : Introduction to 8051 Microcontrollers – 8051 Instruction Set and Programming – Hardware Features of 8051 – 8051 Interfacing examples.

Unit V: 8096 16 bit Microcontrollers

8096 16 bit Microcontrollers : Overview of Intel 8096 microcontrollers – Instruction Set and Programming of 8096 – Hardware Features of 8096

Text Books

- 1." Microprocessors and Interfacing",Douglas V.Hall,Tata Mcgraw Hill,1999
- 2."The Intel Microprocessors – 8086/8088,80186,286,386,486, Pentium Pro Processor", Barry B. Brey, Prentice Hall of India Pvt. Ltd., 1998
- 3."Microprocessors and Microcontrollers", N.Senthil Kumar, M.Saravanan and S.Jeevananthan (Unit IV & V)

Reference Books

- 1."Microcomputer Systems: The 8086 / 8088 Family Architecture, Programming & Design", Yu-Cheng Liu and Glenn A.Gibson, 2nd edition, Prentice Hall of India Pvt. Ltd., 2001
- 2."Microprocessors and Interfacing", A.P Godse and D.A. Godse

Semester II
Core Paper VIII – **COMPILER DESIGN**

UNIT I:

Introduction to the phase of the Compilers – Lexical Analysis, Regular expression, Non-Deterministic automata, deterministic automata equivalent to NFA – Minimizing the states of DFA – implementation of Lexical analyzer

UNIT II:

Syntax Analysis – Top down parsing concepts – Bottom up parsing, handle pruning, shift reducing parsing.

UNIT III:

Intermediate code generation: syntax directed definition, construction of syntax trees – Top down translation, bottom up evaluation of inherited and attributed recursive evaluations, assigning space of compiler construction time – Type checking .

UNIT IV:

Storage Organization: Storage organization, storage allocation strategies, parameter parsing – Symbol tables – Dynamic storage allocation, Intermediate languages – Representation of declarations – Assigning statement, Boolean expressions – Back Patching, procedure calls

UNIT V:

Code generation & Optimization: Design of a code generators – Run time storage management, basic blocks and flow graphs, register allocation & assignment, DAG representation of basic blocks, peep hole optimization, code optimization – the principle source of optimization, optimization of basic blocks, global data flow analysis, loop optimization

Text Book:

1. “Compilers Principles Technical and Tools” – Alfred Aho, Ravi
2. “Compiler construction Principle” – Dhamdare

Reference Book:

1. “Compiler Design” – Reinhard Wilhelm 1995 edition

Semester II
Core Paper IX – **PROGRAMMING IN C# AND .NET FRAMEWORK**

Unit I

Review of OOP Concepts – Overview of .NET Framework – Basic Elements of C# - Program Structure and simple Input and Output Operations – Operators and Expressions – Statement – Arrays and Structures.

Unit II

Inheritance - Namespace – Polymorphism – Interface and Overloading – Multiple Inheritance – Property – Indexes – Delegates – Publish/ Subscribe Design patterns – Operator Overloading – Method Overloading.

Unit III

C# Concepts for creating Data Structures – File Operation – File Management systems – Stream Oriented Operations – Multitasking – Multithreading – Thread Operation – Synchronization.

Unit IV

Working with XML - Techniques for Reading and Writing XML data – using XPath and Search XML – ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding – Data Grid View Class.

Unit V

Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design Guidelines – Assemblies – Security – Application Development – Web Services – Building an XML Web Service – Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service performance.

Text Book(s)

1. S. Thamarai Selvi and R.Murugesan “A Textbook on C#”, Pearson Education,2003.
2. Stephen C.Perry “ Core C# and .NET”, Pearson Education ,2006.

References

1. Jesse Liberty, “Programming C#”, Second Edition, O’ Reilly Press,2002.
2. Robinson et al, “Professional C#”, Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, “ The Complete Reference: C# “, Tata McGraw Hill, 2004.
4. Andrew Troelsen , “C# and the .NET Platform”, A! Press,2003.
5. Thuan Thai and Hoang Q. Lam, “.NET Framework Essentials, Second Edition, O’Reilly, 2002.

CC X - PROGRAMMING IN .NET LAB

1. Design an ASP.Net web form using Html Server Controls to enter Job Seeker's details.
2. Create an ASP.Net web form using Web control to enter E-Mail registration form.
3. Apply appropriate validation techniques in E-Mail registration form using Validation controls.
4. Write an ASP.Net application to retrieve table from MS-Access and display it the client browser using GridView Control.
5. Create a web application using ADO.Net which performs basic data manipulations:
 - (i) Insertion (ii) Updating (iii) Deletion (iv) Selection

Hint: Do operations using Ms-Access and MY SQL.
6. Create an application using Data grid control to access information from table in MY SQL.
7. Create an application using Data list control to access information from table in MY SQL.
8. Job Search Portal.
9. College Portal.
10. Company Portal.
11. Create a website that uses Menu Control.

Semester II

Elective I – **Paper 1 – MOBILE COMMUNICATIONS**

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.

Semester II

Elective I – **Paper 2 — SOFT COMPUTING**

UNIT I – FUZZY SET THEORY : Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II – OPTIMIZATION : Derivative based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative Free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III – NEURAL NETWORKS : Supervised Learning Neural Networks – Perceptrons – Adaline Backpropagation Multilayer perceptrons – Radial Basis Function Networks – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV – NEURO FUZZY MODELING : Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V – APPLICATION OF COMPUTATIONAL INTELLIGENCE : Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK

1. J.S.R. Jang, C.T. Sun and E. Mizutani, “Neuro Fuzzy and Soft Computing”, PHI, Pearson Education, 2004.

REFERENCE BOOK

1. Timothy J. Ross, “Fuzzy Logic with Engineering Application, “ Mc Graw Hill, 1977.
2. Davis E. Goldberg, “Genetic Algorithms Search, Optimization and Machine Learning”, Addison Wesley, 1989.
3. S. Rajasekaran and G.A.V. Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003. Emereo Pty Limited, July 2008.
4. Ahmar, Abbas, “Grid Computing A Practical Guide to technology and Applications”, Charles River media, 2003.

Semester II

Elective II – Paper 1 – 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

Semester II

Elective II – Paper 2 NETWORK SECURITY

Unit I

Introduction: Security Trends – The OSI Security Architecture- Security Attacks – Security Services – Security Mechanisms – A Model for Network Security – Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

Unit II

Block ciphers and the Data Encryption Standard: Block cipher principles – The Data Encryption Standard – The Strength of DES – Differential and Linear Cryptanalysis – Block Cipher Design Principles- Public-Key Cryptography and RSA: principles of Public key Cryptosystems – The RSA Algorithm.

Unit III

Authentication Applications: Kerberos – X.509 Authentication Service – Public-key Infrastructure – Electronic Mail Security: Pretty Good Privacy – S/MIME.

Unit IV

IP Security: IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload – Combining Security Associations – Key Management – Web Security: Web Security Considerations – Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.

Unit V

Intruders: Intruders – Intrusion Detection – Password Management – Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks – Firewalls: Firewall Design Principles – Trusted Systems – Common Criteria for Information Technology Security Evaluation.

Text Book(s)

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Fourth Edition, 2003

References

1. Johannes A. Buchaman , Introduction to cryptography, Springer-Verlag.
2. Atul kahate , Cryptography and Network Security, TMH.

Semester II

Elective II – Paper 3 – GENETIC ALGORITHMS

Unit I

Basics of biological evolution - Darwin, DNA, etc. Basics of Gas – selection, recombination and mutation - Choices of algorithm: (μ, λ) - $(\mu + \lambda)$, 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

Semester III
Core Paper XI – DATA MINING

Unit I: Introduction: Why data Mining? – What is Data Mining? - What kind of Data can be mined? – What kind of Data can be mined? - Which Technologies are used? – Which kinds of Applications are Targeted? – Major Issues in Data Mining – **Getting to know your data:** Data objects and Attribute Types – Basic Statistical Descriptors of data – Data Visualization – Measuring Data Similarity and Dissimilarity – **Data Preprocessing:** Data Preprocessing: An Overview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

Unit-II: Data Warehousing and Online Analytical Processing : Data warehouse: Basic concepts – Data warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data warehouse implementation – Data generalization by attribute oriented induction – **Mining Frequent Patterns, Associations And Correlations :Basic Concepts And Methods:** Basic concepts – frequent itemset mining methods – which patterns are interesting? – pattern evaluation methods.

Unit III: Classification: Basic Concepts: Basic concepts – Decision Tree Induction – Bayes Classification methods – Rule Based Classification – Model evaluation and selection – Techniques to improve classification accuracy – **Classification: Advanced Methods:** Bayesian belief networks – Classification by Backpropagation – support vector machines – classification using frequent patterns – Lazy learners (or learning from your neighbors) – Other classification methods – Addition topics regarding classification.

Unit IV: Cluster Analysis: Basic Concepts and methods: Cluster Analysis – Partitioning methods – Hierarchical methods – Density based methods – Grid based methods – Evaluation of Clustering.

Unit V: Outlier Detection: Outliers and Outliers Analysis – Outlier Detection methods – Statistical Approaches – Proximity based approaches – Cluster based approaches – Classification based approaches – Mining contextual and collective outliers – Outlier detection in high dimensional data.

Text Book

1. Data mining Concepts and techniques – Jiawei Han, Micheline Kamber, Jian Pei, Third Edition, MK Publications.
Unit I (Chapter 1, 2 & 3), Unit II (Chapter 4& 6), Unit III (Chapter 8 & 9),
Unit IV (Chapter 10), Unit V (Chapter 12)

Reference Book

1. Insight to data Mining Theory and Practice , K.P.Soman & Shyam Diwakar and V.Ajay, Prentice Hall of India, 2006 (ISBN – 81-201-2897-3)
2. Introduction to Data mining with case studies, G.K.Gupta, Prentice Hall India, 2006 (ISBN 81-203-3053-6)

Semester III

Core Paper XII –CLOUD COMPUTING

UNIT I

UNDERSTANDING CLOUD COMPUTING : Introduction to Cloud computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why cloud computing Matters – Advantages of Cloud computing – Disadvantages of Cloud Computing – Who Benefits from Cloud computing.

UNIT II

DEVELOPING CLOUD SERVICES :Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development:– Software as a Service – Platform as a Service – Web Services – On-Demand computing -Discovering Cloud Services Development Services and Tools: Amazon - Google App Engine – IBM Clouds.

UNIT III

CLOUD COMPUTING FOR EVERYONE : Cloud computing for the family:Centralizing Email communications – collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists . Cloud computing for the Community : Collaborating on Group Projects and Events -Cloud Computing for the Corporation.

UNIT IV

USING CLOUD SERVICES: Collaborating on Calendars, Schedules and Task Management: Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Word Processing – Collaborating on Databases

UNIT V

STORING AND SHARING FILES AND OTHER ONLINE CONTENT –Understanding cloud storage –Evaluating online file storage and sharing services-Outside the cloud:Other ways to collaborate online :Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

TEXT BOOK

1. Michael Miller, Cloud Computing : Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCE BOOKS

1. Haley Bear, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs.

Semester III

Core Paper XIII- OPEN SOURCE LAB

PHP

- 1) Write a 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 MY SQL table.
- 4) a) Write a PHP program interface to create a database and to insert a table into it.
b) Write a PHP program using classes to create a table.
c) 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.

LINUX

Write Shell Programs for the following using the Linux Operating System

- 1) Write a shell program to find the details of a user session.
- 2) Write a shell program to change the extension of a given file.
- 3) Check whether the given number is prime or not.
- 4) Find the biggest of given two numbers.
- 5) Write a program to check the given number is odd or even.
- 6) Write a program to generate Fibonacci Series.
- 7) Write a program to prepare electric bill for domestic consumers.
For first 100 units - Rs.0.75/ unit
For next 100 units - Rs.1.50/unit
Above 200 units - Rs.3.00/unit.
Prepare the bill for the following format:
Customer No. -----
Customer Name -----
Pre.Reading -----
Cur.Reading -----
Units Consumed -----
Charge -----
Signature
- 8) Write a program to prepare a Payroll with Basic Pay, DA, Allowances, PF and GP.
- 9) Using Case Statement, write a program to check the files ending with vowels.
- 10) Write a program to sort the numbers in ascending and descending order.
- 11) Write a menu driven program to print Bio-data for five persons.

MY SQL LAB

1. Create a MySQL table and write queries to add, insert, delete and modify the data.
2. Consider the following relations:

STUDENT (snum: integer, sname: string, major: string, level: string, age: integer)

CLASS (name: string, meets at: string, room: string, d: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries. No duplicates should be printed in any of the answers.

- i. Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof.Anand.
 - ii. Find the names of all classes that either meet in room R18 or have five or more Students enrolled.
 - iii. Find the names of all students who are enrolled in two classes that meet at the same time.
 - iv. Find the names of faculty members who teach in every room in which some class is taught.
 - v. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.
3. The following relations keep track of airline flight information:

FLIGHTS (no: integer, from: string, to: string, distance: integer, Departs: time, arrives: time, price: real)

AIRCRAFT (aid: integer, aname: string, cruisingrange: integer)

CERTIFIED (eid: integer, aid: integer)

EMPLOYEES (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; Every pilot is certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries.

- i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80, 000.
- ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
- iii. Find the names of pilots whose salary is less than the price of the cheapest route from Chennai to California.

- iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
 - v. Find the aids of all aircraft that can be used on routes from Chennai to New Delhi.
4. The following tables are maintained by a book dealer.

AUTHOR (author-id:int, name:string, city:string, country:string)

PUBLISHER (publisher-id:int, name:string, city:string, country:string)

CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)

CATEGORY (category-id:int, description:string)

ORDER-DETAILS (order-no:int, book-id:int, quantity:int)

- i. Create the above tables by properly specifying the primary keys and the foreign keys.
- ii. Enter at least five tuples for each relation.
- iii. Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
- iv. Find the author of the book which has maximum sales.
- v. Demonstrate how you increase the price of books published by a specific publisher by 10%.

5. Consider the following database for a banking enterprise

BRANCH(branch-name:string, branch-city:string, assets:real)

ACCOUNT(accno:int, branch-name:string, balance:real)

DEPOSITOR(customer-name:string, accno:int)

CUSTOMER(customer-name:string, customer-street:string, customer-city:string)

LOAN(loan-number:int, branch-name:string, amount:real)

BORROWER(customer-name:string, loan-number:int)

- i. Create the above tables by properly specifying the primary keys and the foreign keys
- ii. Enter at least five tuples for each relation
- iii. Find all the customers who have at least two accounts at the Main branch.
- iv. Find all the customers who have an account at all the branches located in a specific city.
- v. Demonstrate how you delete all account tuples at every branch located in a specific city.

Semester III

Core Paper XIV – WEB TECHNOLOGY LAB

1. Create a HTML table with rows & columns and split them using Rowspan and Colspan.
2. Create a web page in the format of front page of a news paper using Text links, Align the text with colors.
3. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.
4. Write an ASP program to prepare Employee pay bill using java script.
5. Write an ASP program to prepare student performance evaluation document using java script.
6. Create an ASP file to display the message “Have a Good Weekend” if it is a Saturday otherwise “Hang in there, the week will get better”.
7. Write an program to get the name and favorite ice cream flavor. Respond with the price of the corresponding ice cream.
8. Create a login form, to expire, if the user does not type the password within 100 seconds.
9. Create an advertisement for a bookshop using Ad Rotator component.
10. Create a course registration form with name, address and list of available course. Reply with the corresponding course fees on selection of a single course or a collection of courses.
11. Write a program to manipulate cookies with the information between HTTP sessions such as
 - i. Last Date visited
 - ii. Last Time visited
 - iii. Number of visits
12. Create a student database and manipulate the records using the connection object in ASP.
13. Create an employee database and manipulate the records using command object in ASP.

Semester III

Elective III – Paper 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 – Onerror – 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-business 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.

Semester III
Elective III – Paper 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

Elective III – Paper 3 – Digital Image Processing

UNIT I:

INTRODUCTION AND DIGITAL IMAGE FUNDAMENTALS: Introduction - What is Image Processing- examples of fields that uses DIP Fundamentals step in DIP. Digital image fundamentals – image sensing and acquisition, Image sampling and quantization – Basic relationship between pixels.

UNIT II:

IMAGE ENHANCEMENT TECHNIQUES: Some basic intensity transformation functions – Histogram processing Fundamental steps of spatial filtering – smoothing spatial filters.

UNIT III:

IMAGE RESTORATION: Model of Image Degradation/restoration process – noise models – restoration in the presence of Noise only Spatial filtering.

UNIT IV:

IMAGE COMPRESSION: Fundamentals – Coding redundancy – Spatial and temporal redundancy – Irrelevant information. Some basic compression methods: Huffman coding – arithmetic coding – LZW coding – Run Length coding – Bit-plane coding.

UNIT V:

IMAGE SEGMENTATION AND REPRESENTATION: Morphological image processing: preliminaries – Erosion and Dilation. Fundamentals – point, line, and Edge detection: Line Detection – Basic edge detection – More advanced techniques for Edge detection – Edge linking and boundary detection – Thresholding

Text Book:

Digital Image Processing, Third Edition, Rafael C. Gonzalez and Richard E. Woods, Pearson Education, 2008. Chapters: 1.1, 1.3, 1.4, 2.3, 2.4, 2.5, 3.2-3.5, 5.1-5.3, 8.1.1, 8.1.2, 8.2.3-8.2.5, 8.2.7, 9.1, 9.2, 10.1, 10.2.3, 10.2.5-10.2.7, 10.3

Reference Books:

1. Fundamentals of Digital Image Processing, Anil K. Jain, Prentice Hall of India, 1989.
2. Digital Image Processing and Analysis, B. Chandra and D. Dutta Majumder, PHI, New Delhi, 2006.

Semester III

Elective IV – Paper 1 – OPEN SOURCE TECHNOLOGIES

Unit - I : OPEN SOURCE -Introduction : Open Source – Open Source vs. Commercial Software – Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts - Security - Basic UNIX: Shell - Owner, Groups, Permissions, Ownership - Processes - PATH and Environment - Commands-Basic File System Essentials - Useful Programs.

Unit - II : Apache Web server: Starting and Stopping and Restarting Apache-Configuration - Securing Apache - Create the Web Site-Apache Log Files.

Unit - III : My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

Unit - IV : PHP: Embedding PHP into HTML -Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs Writing PHP Papers.

Unit - V : Built in PHP function - Important Functions - Array Functions – String Functions - Other Functions - PHP and MySQL: MySQL Functions.

Books for Study

1. James Lee and Brent Lee “Open Source Development with LAMP -Using Linux , Apache, My SQL ,Perl and PHP”, Pearson Education , 2009.

Books for Reference

1. Jon Gerner, Elizabeth Naramore , Morgan Owens and Matt Warden , “Professional LAMP - Using Linux , Apache, My SQL and PHP5Web development”, Wiley Publisher, 2006.

Semester III
Elective IV – Paper 2 – 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 .

Semester III
Elective IV – Paper 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.
3. “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.

Semester IV

Elective V – Paper 1- 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, Gopaldaswamy 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 BenMenachem, Gary S Marliss, Thomson Learning, 2003.

Semester IV

Elective V – Paper 2 - 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 .

Semester IV

Elective V – Paper 3 –PATTERN RECOGNITION

Unit I Introduction and Bayesian Decision Theory-Introduction to pattern recognition, Systems, design cycles, learning and adaptation, Bayesian decision theory, minimum error-rate classification, classifiers, discriminant functions and decision surfaces.

Unit II Maximum – Likelihood and Bayesian parameter estimation - Maximum – Likelihood estimation, Bayesian estimation, Bayesian parameter estimation, Gaussian case and general theory, problems of dimensionality, Hidden Markov models.

Unit III Nonparameter Techniques - Density estimation, Parzen windows, K_n – Nearest neighbour, estimation, The nearest neighbour, k -nearest and nearest – neighbour, classification, fuzzy classification, approximation by series expansions.

Unit IV Linear Discriminant functions - Linear discriminant functions and decision surfaces, generalized linear discriminant functions, The two category uncorrelated case, minimizing the perceptron criterion function, relaxation procedures, nonreversible behaviour, Minimum squared-error procedures, The Ho – Kashyap Procedures, support vector machines, multiclass generalization.

Unit V Multilayer Neural Networks - Feed forward operations and classifications, back propagation algorithm, error factors, back propagation as feature & mapping, back propagation, Bayesian 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