AISECT UNIVERSITY

A STATUTORY UNIVERSITY UNDER SECTION 2(f) OF THE UGC ACT

SCHEME OF EXAMINATION
&
DETAILED SYLLABUS

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COURSE STRUCTURE OF M.PHIL. (CS/IT)					
Sem	**Paper**	**Marks**			**Total Marks**
		Term End Examination	**Internal Assessment (Seminar, Test)**	**Viva**	
I	Theory Paper 1 (Research Methodology) Common To All	80	20	_	100
	Theory Paper 2 (One Subject Specific paper)	80	20	_	100
	Computer Skill	80	_	20	100
II	Dissertation	SCRIPT 150	_	50	200
TOTAL					**500**

PAPER I - RESEARCH METHODOLOGY (COMMON TO ALL SUBJECT)

PAPER 2 - ONE PAPER FROM THE OPTIONS GIVEN (AS PER SUBJECT)

COMPUTER SCIENCE / INFORMATION TECHNOLOGY

- Distributed Operating Systems
- Advanced Networks
- Data Warehousing And Mining
- Digital Image Processing
- Advanced Networking
- Natural Language Processing
- Data Compression
- Agent Based Computing
- Soft Computing
- Embedded And Real Time Operating Systems
- Software Testing And Quality Assurance
- Knowledge Management
- Data Mining And Data Warehousing
- Web Technologies And Services
- Software Technologies
- High Performance Grid And Cluster Computing
- Knowledge Management Systems
- Digital Image Processing And Multimedia
- Advanced Networking And Security
- Biometrics Authentication Systems And Embedded Systems
- Next Generation Heterogeneous Networks

PRACTICAL - JAVA PROGRAMMING

M.PHIL SYLLABUS

COMMON PAPER (APPLY TO ALL)

PAPER I - RESEARCH METHODLOGY

UNIT-I

Research- Definition, Importance and Meaning of Research, Characteristics of Research, Types of research, Steps in research, Selection and Formulation of research problem, Sources of research problems, criteria / characteristics of a good research problem, errors in selecting a research problem.

UNIT-II

Hypotheses- meaning and characteristics of working hypotheses, problem in formulating hypotheses, sources of Hypotheses, Origin of hypotheses, types and significance of Hypotheses.

UNIT-III

Research Design- Meaning, Objectives and contents of Research, Types of experimental Research Design, Collection of Primary data-Observation Methods, questionnaire method and schedule methods.

UNIT-IV

Case study Methods-Its Characteristics Advantages and limitation, Sampling techniques: Sampling Theory, types of sampling, Steps in sampling, Sampling and Advantages and Limitations of Sampling, Calculation of standard error's T - test and Z - Test, Chi-square tests, ANOVA-One-way / Two- way and analysis of variance.

UNIT-V

Research Reports- Types of reports- contents- Format & Styles of reporting- steps in drafting reports- Editing the final draft-Evaluating the final draft. Analysis and Interpretation of Data and Report Writing, References and Bibliography.

REFERENCE BOOKS:

1. Research Methodology : C.R. Kothati
2. Research Methodology : H.K. Kapil
3. Statistics (Theory & Practice) : B. N. Gupta
4. Social Research & Statistical : R.N. Mukhargi
5. Social Research : D.S. Baghel
6. Statistical Methods : S. P. Gupta

THESIS / DISSERTATION

To be prepared by all students individually under a supervisor. A synopsis should be submitted and approved by the DRC of the concerned department.

M.PHIL. PAPER II (SUBJECT SPECIFIC)

CHOOSE ANY ONE OPTIONAL PAPERS FROM THE FOLLOWING GIVEN OPTIONS

COMPUTER SCIENCE / INFORMATION TECHNOLOGY

(A) DISTRIBUTED OPERATING SYSTEMS

UNIT- I

FUNDAMENTALS:
Characteristics & Challenges of distributed systems design issues in distributed operating system. Architectural models. DCE message passing, Desirable features of good message passing system. Issues in IPC by message passing, synchronization, Buffering, multidatagram messages, Encoding & decoding of message data, process addressing, failure handling, Group Communication.

UNIT-II

REMOTE PROCEDURE CALL :
RPC model, Transparency of RPC, implementing RPC mechanisms, RPC messages, server Management, Parameter- passing semantics, call semantics communication protocols for RPC, client - server binding, RPC in hetero geneous Environment.

UNIT-III

SYNCHRONIZATION :
Synchronization in distributed systems: Clock Synchronization, mutual exclusion, Election Algorithms, the Bully algorithm, a ring algorithm, atomic tractions, dead lock in distributed systems, distributed dead lock prevention, and distributed dead lock detection.

UNIT-IV

RESOURCE & PROCESS MANAGEMENT :
Desirable features of good global scheduling algorithm, Task Assignment Approach, Load- Balancing Approach sharing Approach, process management: process migration. Processes and processors in distributed systems: Threads, system, models, Processor allocation, scheduling in distributed system, fault tolerance and real time distributed systems.

UNIT-V

DISTRUBUTED FILE SYSTEMS & MEMORY MANAGEMENT:
Distributed file systems design, distributed file system implementation, trends in distributed file systems.

Distributed shared memory: What is shared memory, consistency model, page based

distributed shared memory, shared variable, distributed shared memory, object based DSM.

UNIT-VI

CASE STUDY MACH:
Introduction to MACH, process management, in MACH, Memory management in MACH, communication in MACH, UNIX emulation in MACH.

Case study AMOEBA, KERBEROS authentication system, Digital signature.

REFERENCE BOOKS:

1. Distributed operating system: Principles and Paradigms - A.S.Tanebaum and Marten Vanstein.
2. Operating systems - internal and design principles, 4th Ed., - W.Stallings.
3. Distributed operating system: Principles and Paradigms - P. K. Sinha (PHI)

(B) ADVANCED NETWORKS

UNIT - I

NETWORK ARCHITECTURE:
Layering & Protocols - OSI & Internet Architecture - Network topology Link & Medium Access protocols - IEEE 802 standards - Performance issues - Network Adaptors.

NETWORK LAYER:
Circuit switching - packet switching - Internetworking - bridges - Internet protocol - Addressing - Routing Protocols.

END - TO - END PROTOCOL :
UDP - TCP- Congestion Control - Presentation aspects

APPLICATIONS:
Telnet, FTP - e-mail - DNS - Multimedia Applications - Security

NETWORK MANAGEMENT:
Monitoring & Control - SNMP,V2,V3,RMON,RMON2

UNIT - II

INTERNET WORKING :
Routing Protocols, Mobile IP, IPv6, TCP, UDP, Network management and storage area Network NMS, SNMP, Backup and mirroring , management of Network storage architectures.

JAVA :
Java fundamentals - IO Streaming - Object Serialization - Applications - Native Interfaces - Image Processing

ADVANCED JAVA:
Remote method invocation - Multicasting - JDBC - Server side programming - Enterprise Applications - Automated Solutions.

UNIT - III

MESSAGE AUTHENTICATION:
Hash Functions - Digest Functions - Digital Signatures - Authentication protocols.

NETWORK SECURITY PRACTICE:
Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

SYSTEM SECURITY:
Firewalls - Current Standards.

UNIT - IV

NETWORK ISSUES:
Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP - Mobile TCP - Transmission / time-out freezing - Selective retransmission - Transaction oriented TCP.

APPLICATION ISSUES :
Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol-Context-aware applications.

WIRELESS COMMUNICATION:
IEEE 802.11, Blueboth, CDMA, GPS, GPRS, Wireless LAN.

UNIT - V

INTERNETWORKING WITH ATM :
LAN - IP over ATM - Multiprotocol over ATM - Frame Relay over ATM.

WIRELESS NETWORKS:
The wireless channel - Link level design - Channel access - Network design -Standards.

RECENT TRENDS:
Optical Networks - Cross connects - LANS - Voice Over IP - Multimedia Networks.

REFERENCE BOOKS:

1. Peterson Davie - Computer Networks - A Systems approach, Morgan Kauffman -Harcourt Asia, 2nd Edition, 2000
2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 3rd Edition, Addison Wesley, 2000.
3. Abraham Silberschatz, Henry. F. Korth, S.Sudharsan, Database System Concepts, 3rd Edition, Tata McGraw Hill, 1997.
4. D. Norton and H. Schildt - Java2: The complete reference - TMH 2000.

(C) DATA WAREHOUSING AND MINING

UNIT - I

Data Warehousing Introduction - Definition-Architecture-Warehouse hema-Warehouse server-OLAP operations. Data Warehouse technology - Hardware and operating system-Warehousing Software - Extraction tools - Transformation tools - Data quality tools - Data loaders - Data Access and retrieval tools - Data Modeling tools - Fact tables and dimensions Data warehousing case studies : Data warehousing in Government , Tourism, Industry , Genomics data.

UNIT - II

Data Mining definition - DM Techniques - current trends in data mining - Different forms of Knowledge - Data selection, cleaning, Integration , Transformation, Reduction and Enrichment . Data: Types of data - Data Quality - Data Preprocessing - Measures of similarity and dissimilarity. Exploration : Summary statistics - Visualization.

UNIT - III

Association rules: Introduction - Methods to discover association rule - Apriori algorithm Partition Algorithm - Pincher search algorithm - Dynamic Item set algorithm - FP Tree growth algorithm. Classification: Decision Tree classification - Bayesian Classification - Classification by Back Propogation.

UNIT - IV

Clustering Techniques: Introduction - Clustering Paradigms - Paritioning Algorithms - K means & K Mediod algorithms - CLARA - CLARANS - Hierarchical clustering - DBSCAN - BIRCH - Categorical Clustering algorithms - STIRR - ROCK - CACTUS.

Introduction to machine learning - Supervised learning - Unsupervised learning - Machine learning and data mining. Neural Networks : Introduction - Use of NN - Working of NN Genetic Algorithm : Introduction -Working of GA

UNIT - V

Web Mining: Introduction - Web Content Mining - Web structure mining - web usage mining - Text Mining - Text Clustering Temporal Mining -spatial mining - Visual data mining - Knowledge mining.

TEXT BOOKS:

1. Arun k Pujari , “Data Mining Techniques”, University press , edition 2001.
2. Jaiwei Han, Michelinne Kamber , “Data Mining : Concepts and Techniques “
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar,“Introduction to Data Mining”, 2007.
4. T.Sushmita mitra, Tir ku Acharaya , “Data Mining Multimedia , Softcomputing & Bioinformatics”, Wiley Interscience publications , 2004.
5. Michal J A Berry , Gordon Linoff , “Mastering Data Mining” , John Wiley & Sons ,2000.
6. Alex Berson , Stephen J.Smith , “Data Warehousing , Data Mining & OLAP “, Tata McGrawhill
7. C S R Prabhu, “Data Warehousing - concepts , techniques and applications “, Prentice Hall of India, 2nd edition , 2002.

REFERENCE BOOKS :

1. David Hand, Heikki Mannila , Padhraic smyth, “Principles of Data Mining”, the MIT Press, Massachusetts Institute of Technology , Cambridge.
2. Usama M Fayyad, Gregory Piatskey Sharpio, Padhr Smyth, Ramasamy Uthurusamy , “Advances in Knowledge discovery and data mining”.
3. Mehmed Kantardzix,”Data Mining : Concepts Models,methods and algorithms”.
4. Mark Humphries , Michal W Hawkins & Michelle C dy, “Data warehousing architecture and implementation”, Prentice hall of India,1999.
5. Margaret H.Dunham ,”Data Mining introductory and advanced topics”.
6. Sumathi, S.N. Sivanandam, “Introduction to Data Mining and its Applications “,Springer.

(D) DIGITAL IMAGE PROCESSING

UNIT - I

Digital image processing - fundamental steps in image processing - elements of image processing systems. Digital image fundamentals: A simple image model - sampling and quantization - some basic relationships between pixels. Introduction to Fourier transform - the discrete Fourier transform - properties of the two-dimensional Fourier transform.

Image Enhancement: Enhancement by point processing - spatial filtering - enhancement in the frequency domain - generation of spatial masks form frequency domain specifications - color image processing

UNIT - II

Image restoration: Degradation model - diagonalisation of circulant and block circulant matrics - Algebraic approach to restoration - inverse filtering. Image compression: Fundamentals - image compression models - error-free compression - lossy compression - image compression standards.

UNIT - III

Image segmentation: Detection of discontinuities - edge linking and boundary detection – thresholding region oriented segmentation. Representation and description: representation schemes - boundary descriptors - regional descriptors. Elements of image analysis - Patterns and Pattern classes - decision theoretic methods - structural methods - interpretation

UNIT - IV

Image processing - pattern recognition - relationship between image processing and pattern recognition. Object detection: introduction. Shape analysis: introduction - convex hull - convex hull based representation - fractals - fractals based image shape representation.

UNIT - V

Wavelets: introduction - properties of wavelets - fast wavelet transform - wavelet decomposition structures and coefficients - inverse fast wavelet transform - application of wavelets in image processing

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image processing using MATLAB”, Pearson Education, 2004
2. Rafael C. Gonzalez, Richard E. Woods, “Digital Image processing”, 2nd ed., Prentice Hall, NJ., 2002
3. Russ J. C., “The image processing handbook”, 3rd ed., CRC Press, 1999

(E) ADVANCED NETWORKING

UNIT - I

CIRCUIT SWITCHING NETWORKS:
AT & T's Dynamic Routing Network, Routing in Telephone Network - Dynamic Non Hierarchical Routing - Trunk Status Map Routing - Real Time Network Routing, Dynamic Alternative Routing - Distributed Adaptive Dynamic Routing - Optimized Dynamic Routing.

UNIT – II

PACKET SWITCHING NETWORKS:
Distance Vector Routing-Link State Routing-Inter Domain Routing - Classless Interdomain Routing (CIDR), Interior Gateway Routing Protocols (IGRP) - Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Exterior Gateway Routing Protocol(EGRP)-Border Gateway Protocol(BGP), Apple Talk Routing and SNA Routing

UNIT - III

HIGH SPEED NETWORKS:
Routing in optical networks- The optical layer, Node Designs, Network design and operation, Optical layer cost tradeoffs, Routing and wavelength assignment, Architectural variations, Routing in ATM networks - ATM address structure, ATM Routing, PNNI protocol, PNNI signaling protocol, Routing in the PLANET network and Deflection Routing.

UNIT - IV

SECURITY AND CRYPTOGRAPHY:
Introduction to Security - Security Attacks, services and Mechanisms - Data Encryption Standard - Advanced Encryption Standard-Public-Key Cryptography and RSA - Message Authentication and Hash Functions - Hash and MAC algorithms - Digital Signatures and Authentication Protocols

UNIT – V

NETWORK SECURITY:
Authentication Applications - Electronic Mail security - IP Security - Web security - Intruders - Malicious Software - Firewalls.

TEXT BOOKS:

1. M Steen Strub,"Routing in Communication Networks",PH International,NY 1995.
2. William Stallings,"ISDN & Broadband ISDN with Frame Relay and ATM", PHI, ND, 2004.
3. William Stallings, "Cryptography and Network Security", PHI, 2006

REFERENCE BOOKS:

1. "Internetworking Technologies Hand Book", Fouth Edition, Inc. (CISCO System , ILSG Cisco System 2003)
2. William Stallings, "High Speed Networks TCP/IP and ATM Design Principles", PH International, NY, 1998.
3. "Behrouy A Ferouzan", Data Communications and Networking (3/e) TMH, 2004
4. Charlie Kaufman, Radia Rerlman Mike Specines, "Network Security - Private Communication in a Public World", PHI (2/e) 2002.

(F) NATURAL LANGUAGE PROCESSING

UNIT - I

Natural Language Processing (NLP) - open problems - major goal - language structure - language analyzer - morphological analyzer - local world grouper (LWG) - core parser - requirements of computational grammars - computational aspect - system aspect - large system aspect - morphological analysis - morphological generation using paradigms - morphological analysis using paradigms - speeding up morphological analysis by compilation - morphological analyzer - additional issues - local word grouping - verb groups - noun groups - strategy for grammar development - semantics in stages.

UNIT - II

Paninian grammar - semantic model - free word order and vibhakti - paninian theory - karaka relations - active passive - control - karaka to vibhakti mapping - karaka sharing.

UNIT - III

Machine translation - survey - is MT possible? - Possible approaches - current status - anusaraka or language accessor - cutting the Gordian knot - structure of anusaraka systems - user interface - linguistic area - anusaraka output - language bridges.

UNIT - IV

Lexical functional grammar - active passive and dative constructions - WH movements in questions - LFG formalism - well formedness conditions - handling WH movements in questions - computational aspects - features and feature structures - unification - other constraints - CFG and Indian languages

functional specification - lexicalized grammars and locality - lexicalized tree substitution grammar - lexicalized tree adjoining grammar - feature structures - mathematical aspects

UNIT - V

Comparing TAG with PG - similarities between TAG and PG - differences between TAG and PG - Government and binding - GB modules - X-bar theory - theta theory - Government - Case theory - bounding theory - empty category principle (ECP) - binding theory - constraints on movement - GB parsing - comparing GB with PG

REFERENCE BOOKS :

1. Akshar Bharati, Vineet Chaitanya, Rajeev Sangal, “Natural Language Processing - A Paninian Prespective”, Prentice Hall of India, 2000
2. James Allen, Natural Language Understanding, Pearson Education, 3rd edt., 2005

(G) DATA COMPRESSION

UNIT-I

INTRODUCTION:
Compression Techniques - Lossy compression & Lossless compression, modeling and compression Mathematical modeling for Lossless compression- Physical models, probability models, Markov Models and composite source models. Mathematical modeling for Lossy compression - physical models, Probablity models and linear systems models.

UNIT - II

DIFFERENT METHODS OF COMPRESSION:
Basic Techniques: Run length encoding, RLE Text compression, RLE image compression and scalar quantization.

Statistical Methods: Information theory concepts, Huffman coding, Adaptive Huffman coding, facsimile compression Arithmetic coding and Adaptive, Arithmetic coding and Text compression.

Dictionary methods: String compression, LZ 77, LZSS, LZ78,LZW, Unix compression, GIF image, ARC and PKZIP, Data compression patterns.

Wavelet methods : Fourier Image compression, Multi Resolution decomposition and JPEG 2000.

UNIT-III

IMAGE COMPRESSION:
Intuitive Methods, Image Transforms, JPEG, Progressive Image compression, Vector quantization, Adaptive Vector Quantization, Block Matching, Block Truncation coding. Context Tree weighting, Block Decomposition, Binary Tree predictive coding, Quad Trees and Finite Automata Methods.

UNIT -IV

VIDEO COMPRESSION:
Analog Video, Composite and Components Video, Digital Video, Video compression, MPEG and H.261.

UNIT - V

AUDIO COMPRESSION:
Sound, Digital Audio, The Human Auditory System, p -Law and A-Law companding, ADPCM Audio compression and MPEPG-1 Audio Layers.

TEXT BOOKS :

1. David salomon, “Data compression - The complete Reference”, Springer Publications(2nd Edition)
2. Mark Nelson and Jean-Loup Gailly, “The Data compression Book”, Mark Nelson and Jean-Loup Gailly, BPB publications (2nd Edition)
3. Khalid Sayood, “Introduction to Data Compression”,Harcout India(P) Ltd,New Delhi

(H) AGENT BASED COMPUTING

UNIT - I

Introduction to Software Agents: What is a software agent? - Why software agents? - Applications of Intelligent software agents-Practical design of Intelligent agent systems.

UNIT - II

Intelligent Agent Learning- Approaches to Knowledge base development-Disciple approach for building Intelligent agents- Knowledge representation-Generalization-Problem solving methods-Knowledge elicitation.

UNIT - III

Rule learning: Rule learning problem- Rule learning method- Learned rule characterization. Rule refinement: Rule refinement problem- Rule refinement method-Rule experimentation and verification- Refined rule characterization-Agent interactions.

UNIT - IV

Disciple shell: Architecture of Disciple shell- Methodology for building Intelligent Agents- Expert-Agent interactions during knowledge elicitation process- Expert-Agent interactions during rule learning process- Expert-Agent interactions during rule refinement process.

UNIT - V

Case studies in building Intelligent agents: Intelligent Agents in portfolio management-Intelligent Agents in financial services- Statistical Analysis assessment and support agent- Design assistant for configuring computer systems.

REFERENCE BOOKS:

1. Jeffrey M Bradshaw, "Software Agents", AAAI Press/ The MIT Press, Standard Edition.
2. Nicholas R Jennings, Michael J Wooldridge (Eds.), "Agent Technology - Foundations, Applications and Markets", Springer, 1997.
3. Gheorghe Tecuci et al., "Building Intelligent Agents", Academic Press, 2003.
4. Eduardo Alanso, Daniel Kudenko, Dimitar Kazakov (Eds.) "Adaptive Agents and Multi-Agent Systems, Springer Publications, 2003.

SOFT COMPUTING

UNIT - I

Fundamentals of ANN: The Biological Neural Network, Artificial Neural Networks - Building Blocks of ANN and ANN terminologies: architecture, setting of weights, activation functions - McCulloch-pitts Neuron Model, Hebbian Learning rule, Perception learning rule, Delta learning rule.

UNIT - II

Models of ANN: Single layer perception, Architecture, Algorithm, application procedure - Feedback Networks: Hopfield Net and BAM - Feed Forward Networks: Back Propogation Network (BPN) and Radial Basis Function Network (RBFN) - Self Organizing Feature Maps: SOM and LVQ

UNIT - III

Fuzzy Sets, properties and operations - Fuzzy relations, cardinality, operations and properties of fuzzy relations, fuzzy composition.

UNIT - IV

Fuzzy variables - Types of membership functions - fuzzy rules: Takagi and Mamdani - fuzzy inference systems: fuzzification, inference, rulebase, defuzzification.

UNIT - V

Genetic Algorithm (GA): Biological terminology - elements of GA: encoding, types of selection, types of crossover, mutation, reinsertion - a simple genetic algorithm - Theoretical foundation: schema, fundamental theorem of GA, building block hypothesis.

TEXT BOOKS :

1. S. N. Sivanandam, S. Sumathi, S.N. Deepa, Introduction to Neural Networks using MATLAB 6.0 , Tata McGraw-Hill, New Delhi, 2006
2. S. N. Sivanandam, S.N. Deepa, Principles of Soft Computing, Wiley-India, 2008.
3. D.E. Goldberg, Genetic algorithms, optimization and machine learning, Addison Wesley 2000.

REFERENCE BOOKS:

1. Satish Kumar, Neural Networks - A Classroom approach, Tata McGraw-Hill, New Delhi, 2007.
2. Martin T. Hagan, Howard B. Demuth, Mark Beale, Neural Network Design, Thomson Learning, India, 2002.
3. B. Kosko, Neural Network and fuzzy systems, PHI, 1996.
4. Klir & Yuan, "Fuzzy sets and fuzzy logic - theory and applications, PHI, 1996.
5. Melanie Mitchell, An introduction to genetic algorithm, PHI, India, 1996.

(J) EMBEDDED AND REAL TIME OPERATING SYSTEMS

UNIT - I

Introduction to Embedded Systems-Categories of embedded Systems-specialties of embedded systems- requirements of embedded systems -challenges and issues in embedded software development - recent trends in embedded systems-Architecture of embedded systems: Hardware architecture - software architecture-application software - communication software -Embedded systems on a Chip (SoC) and the use of VLSI designed circuits.

UNIT - II

Hardware Fundamentals- Terminology-Gates-Timing Diagrams-Memory- Advanced Hardware Fundamentals- Microprocessors-Microprocessor Architecture-Direct Memory Access - Interrupts and Software Architecture- Interrupts- Interrupts Basics - Interrupt Service Routines- Survey of Software Architectures- Round Robin with interrupts- Function-Queue-Scheduling Architecture-Real Time Operating Systems Architecture.

UNIT - III

Applications of Embedded Systems-Application market segments-consumer electronics control system and industrial automation - biomedical systems- field instrumentation - handheld computers - data communication - networked information appliances - telecommunications - wireless communication.

UNIT - IV

Introduction to real time theory-Scheduling theory-rate monotonic scheduling-utilization bound theorem-Introduction to Real time Operating System -Desktop OS vs. RTOS - need for BSP in embedded systems - Issues in Real time computing -Structure of a real time system - task management - race condition - priority inversion - RTOS under the hood - ISRs and scheduling - Inter task communication - timers - programming language and tools.

UNIT - V

Case Study-QNX Neutrino, VxWorks, MicroC/OS-II, RTLinux, POSIX, Embedded NT, and Windows XP embedded.

TEXT BOOKS:

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw- Hill, First Reprint 2003
2. David E.Simon, an Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Dreamtech Software Team, Programming for Embedded Systems, Wiley Publishing Inc., 2003Ahmed M Ibrahim , Fuzzy logic for Embedded Systems Applications, Newness an imprint of Elsevier, 2004
4. Dr.K.V.K.K Prasad, Embedded/Real Time Systems: Concepts, Design and Programming - The Ultimate Reference, Dreamtech Press, 2003
5. Sriram Iyer, Pankaj Gupta, Embedded Real time Systems Programming , Tata McGraw Hill Publishing Company Limited, 2004

REFERENCE BOOKS:

1. Lewin A.R.W.Edwards, "Embedded System Design on a Shoestring, Newness an imprint of Elsevier
2. C.M. Krishna, Kang G.Shin, Real Time Systems, The McGraw Hill International Editions Computer Science Series.

(K) SOFTWARE TESTING AND QUALITY ASSURANCE

UNIT - I

Introduction to software quality - Software modeling - Scope of the software quality program - Establishing quality goals - Purpose, quality of goals - SQA planning software - Productivity and documentation, Software quality assurance plan - Purpose and Scope, Software quality assurance management - Organization - Quality tasks - Responsibilities - Documentation. Standards, Practices, Conventions and Metrics, Reviews and Audits - Management, Technical review - Software inspection

Process - Walk through process - Audit process - Test processes - ISO, CMM compatibility - Problem reporting and corrective action.

UNIT - II

Tools, Techniques and methodologies, Code control, Media control, Supplier control, Records collection, Maintenance and retention, Training and risk management. ISO 9000 model, CMM model, Comparisons, ISO 9000 weaknesses, CMM weaknesses, SPICE - Software Process Improvement and Capability determination.

UNIT - III

Purpose of Software testing - Some Dichotomies - a model for testing - Playing pool and consulting oracles - Is complete testing possible - The Consequence of bugs - Taxonomy of Bugs. Software testing Fundamentals - Test case Design - Introduction of Black Box Testing and White Box testing - Flow Graphs and Path testing - Path testing Basics - Predicates, Path Predicates and Achievable Paths - Path Sensitizing - Path Instrumentation -Implementation and Application of Path Testing.

UNIT - IV

Transaction Flow testing - Transaction Flows - techniques - Implementation Comments - Data Flow Testing - Basics - Strategies - Applications, Tools and effectiveness - Syntax Testing - Why, What, How - Grammar for formats - Implementation - Tips. Logic Based Testing - Motivational Overview - Decision tables - Path Expressions - KV Charts - Specifications - States, State Graphs and transition Testing - State Graphs - Good & bad states - state testing Metrics and Complexity.

UNIT - V

Testing GUIs - Testing Client - Server Architecture - Testing for Real-time System - A Strategic Approach to Software testing - issues - unit testing - Integration Testing - Validation testing - System testing - The art of Debugging.

REFERENCE BOOKS :

1. Mordechai Ben - Meachem and Garry S.Marliss, “Software Quality-Producing Practical, Consistent Software”, International Thompson Computer Press, 1997
2. Watt. S. Humphrey, “Managing Software Process”, Addison - Wesley, 1998.
3. Philip.B.Crosby,“Quality is Free:The Art of making quality certain”, Mass Market, 1992
4. Boris Beizer, Software Testing Techniques, Dreamtech Press, Second Edition -

2003.
5. Myers and Glenford.J., The Art of Software Testing, John-Wiley & Sons,1979
6. Roger.S.Pressman, Software Engineering - A Practitioner's Approach ,Mc-Graw Hill, 5th edition, 2001
7. Marnie.L. Hutcheson, Software Testing Fundamentals, Wiley-India,2007

(L) KNOWLEDGE MANAGEMENT

UNIT - I

Basics - What is Knowledge Management? - Key Challenges - KM Life Cycle - Understanding Knowledge - Definitions - Cognition and Knowledge Management - Data, Information, and Knowledge - Types of Knowledge - Expert Knowledge.

UNIT - II

Knowledge Management System Life Cycle - Challenges in Building KM Systems - Conventional Versus KM System Life Cycle - KM System Life Cycle - System Justification - Role of Rapid Prototyping - Role of Knowledge Developer - User Training.

UNIT - III

Knowledge Creation - Nonaka's Model of Knowledge Creation and Transformation - Knowledge Architecture - Capturing Tacit Knowledge - Evaluating the Expert - Developing a relationship with Expert - Fuzzy Reasoning and the Quality of Knowledge Capture - Interview as a tool – Brainstorming Repertory Grid - Nominal- Group Techniques(NGT) - Delphi method - Concept mapping

UNIT - IV

Knowledge Codification - Codification Tools and Procedures - Knowledge Developers Skill Set - Knowledge Transfer - Transfer Methods - Role of the Internet in Knowledge Transfer - Knowledge Transfer in the E-World - E-Business - KM Tools :- Personal KM Tools, What next - from GUI to CIM, Software - Knowledge Technologies :- State of Technology, KM Gets Unconventional, Application is the Key, Content Mgmt, Technology components of KM, ERP and BPR, Meta-data Architecture.

UNIT - V

Knowledge Management Tools and Knowledge Portals - Portals Basics - Business Challenge - Knowledge Portal Technologies - Ethical and Legal Issues - Knowledge Owners - Legal Issues - The Ethical Factors - Futuristic KM.

TEXT BOOKS :

1. Elias M.Awad, Hassan M.Ghaziri, ''Knowledge Management", Pearson Education (Edition 2004).

REFERENCE BOOKS :

1. A Thothathri Raman, Knowledge Management a resource book, EXCEL Books, 2004. ISBN 817446-351-8 (PB), 81-7446-352-6 (HB)
2. Kai Mertins, Peter Heisig , Jens Vorbeck ," Knowledge Management: Concepts and Best Practices" ,Springer Publications, Second Edition.
3. Amrit Tiwana, The Essential Guide to Knowledge Management - E-Business and CRM Applications, Pearson Education Asia, ISBN 81-7808-326-4

(M) DATA MINING AND DATA WAREHOUSING

1. INTRODUCTION: FUNDAMENTALS OF DATA MINING

- Data mining Functionalities,
- Classification of Data Mining Systems,
- Major issues in Data Mining,
- Data Warehouse and OLAP Technology for Data mining
- Data Warehouse, Multidimensional Data Model,
- Data Warehouse Architecture, Data Warehouse implementation,
- Development of Data Cube Technology,

DATA PREPROCESSING, DATA MINING PRIMITIVES, LANGUAGES, AND SYSTEM ARCHITECTURES

- Needs Preprocessing the Data,
- Data Cleaning, Data Integration and Transformation,
- Data Reduction, Discretization and Concept Hierarchy Generation.
- Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on Data Mining Query Language Architectures of Data Mining Systems.

CONCEPTS DESCRIPTION AND MINING ASSOCIATION RULES

- Characterization and Comparison: Data Generation and Summarization
- Bases characterization, Analytical Characterization: Mining Class Comparisons
- Association Rule Mining,
- Rules from Relational Databases and Data Warehouses

CLASSIFICATION , PREDICTION AND CLUSTER ANALYSIS INTRODUCTION

- Issues Regarding Classification and Prediction,
- Classification by Decision Tree , Classification by Backpropagation
- Classification Based on Concepts from Association Rule Mining
- Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density , Based Methods
- Grid Based Methods, Model - Based Clustering Methods, outlier analysis. Multidimensional Analysis and Descriptive

MINING COMPLEX TYPES OF DATA

- Mining of Complex, Data Objects, Mining Spatial Databases
- Mining Multimedia Databases
- Mining Time - Series and Sequence Data, Mining Text Databases,
- Mining the World Wide Web.

REFERENCE:

1. Data Mining - Concepts and Techniques - JIAWEIHAN & MICHELINE KAMBER Morgan Kaufamann publishers.
2. Data Ming Techniques - ARJUN K PUJARI, Universities Press.
3. Data Warehousing in the Real world SAM ANAHORY & DENNIS MURRA Y. Pearson Edn Asia.

(N) WEB TECHNOLOGIES AND SERVICES

1. HTML ,DHTML AND SCRIPTING LANGUAGE

- Common tags - HTML Tables and formatting internal
- linking - Complex HTML forms.
- Java Scripts - Control structures
- DHTML - CSS - event model - filters & transitions.

2. APPLETS AND AWT PROGRAMMING

- Review of Applets, Class, Event Handling,
- AWT Programming.
- Introduction to Swing: Japplet, Handling Swing Controls
- Tables, Differences between AWT Controls & Swing Controls
- Developing a Home page using Applets & Swing. Multi-Threading and RMI.

3. JAVA BEANS AND SERVLETS

- Introduction and Advantages of Java Beans
- BDK, Introspection, Using Bound properties, Bean Info Interface
- Constrained properties, persistence, Customizers, Java Beans API
- Life Cycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package
- Reading Servlet parameters, Reading Initialization Parameters
- The javax.servlet HTTP package, Handling, Http Request & responses
- Using Cookies - Sessions Tracking, Security Issues.

4. JSP

- Introduction to JSP: The Problem with Servlets, The Anatomy of a JSP Page,
- JSP Processing, JSP Application Design with MVC. Tomcat Server & Testing Tomcat.
- JSP Application Deployment

5. JDBC

- Database Access, Database Programming using JDBC,
- Studying javax.sql.* package.
- Accessing a Database from a JSP Page.

REFERENCE:

1. Internet and World Wide Web - How to program by Dietel, and Nieto Pearson Education Asia. (Chapters: 3,4,8,9,10,11,12-18).
2. The Complete Reference Java 2 third Edition by Patrick Naughton and Herbert Schildt. (Chapters: 19,20,,21,22,25,27).
3. Java Server Pages by Hans Bergstan. (Chapters: 1-9).

(O) SOFTWARE TECHNOLOGIES

1. SOFTWARE MANAGEMENT CONCEPT

- Software process
- Software project Metrics
- Software project Planning
- Risk Management

2. SOFTWARE QUALITY ASSURANCE

- Quality Concepts
- Quality Movement
- Software Review
- Software Quality Assurance
- Formal Technical Reviews

3. SOFTWARE TESTING

- Software Testing Fundaments
- Test Case Design
- Basic path Testing
- Control Structure Testing
- A Strategic approach to software

4. ENTERPRISE APPLICATION INTEGRATION

- Concepts and challenges of integrating different application
- Different heterogeneous platform
- EAI architecture , EAI approaches data level
- Application / process level , method level

5. MESSAGING CONCEPTS AND SERVICES

- Messaging concepts and various types of messaging services
- Middleware and adapter services , Transaction middle aware
- EAI process methodology

REFERENCES:

Software Engineering - Roger S.Pressman , fifth edition, Mc Graw hill.

(P) HIGH PERFORMANCE GRID AND CLUSTER COMPUTING

1. INTRODUCTION AND REMOTE COMPUTING MODEL

- Cluster to grid computing, grid models, mobile grid models applications
- Definitions of Grid Computing and its Taxonomy
- Anonymous remote computing model
- Issues in parallel computing on interconnected network, existing distributed computing approach,
- ARC model of computation ,two tier Arc language constructs Classifications of Grids

2. GRID SERVICE ARCHITECTURE AND APPLICATION

- The Open Grid Services Architecture (OGSA),
- Creating and Managing Grid Services,
- Web Services and Utility Computing, Grid-Enabling Software Applications
- Application Integration, Grid-Enabling Network Services
- Management of Grid Environments, Grid-enhanced Applications in Research and Industry

3. DESIGN AND IMPLEMENTATION OF THE GRID MODEL

- model, design and implementation of the model,
- Parallel simulated Annealing Algorithms , simulated annealing technique, clustering algorithm for simulated annealing Services and Protocols:
- Scheduling and Resource Management, Security, Data Handling, Quality of Service, Monitoring, Information Services, Open Grid Services Architecture

4. DISTRIBUTED AND CLUSTER COMPUTING

- Distributed and Cluster (HPC/HTC) computing principles,
- Parallel computing models: Message passing, Remote procedure calls, Shared memory models.

5. CLUSTER COMPUTING

- Cluster computing : hardware and software configuration, job scheduling,
- MPI , Performance and benchmarking, Standard parallel algorithms
- Parallel I/O storage technologies, Load balancing and scheduling
- Appropriate applications.

REFERENCE:

- Grid Comuting by D Janakiram
- Grid Computing: Making The Global Infrastructure a Reality (Hardcover)
- The Grid: Core Technologies by Maozhen Li, Mark Baker
- Grid Computing:The Savvy Manager's Guide by awel Plaszczak and Rich Wellner
- Parallel Programming in C with MPI and OpenMP, by Michael Quinn, McGraw-Hill Higher Education, ISBN: 0072822562, 2004.
- Foundations of Multithreaded, Parallel, and Distributed Programming, by

Gregory R. Andrews, ISBN: 0201357526, Addison Wesley, 2000.
- Introduction to Parallel Computing, by Ananth Grama, ISBN:0201648652, Addison Wesley, 2003.

(Q) KNOWLEDGE MANAGEMENT SYSTEMS

1. OVERVIEW OF KM

Scope and significance, techniques, difficulties (Road Map), implementation, KM and sharing, types of KM, Principles, dynamics.

2. DRIVERS OF KM

Pillars of KM, Seven Layers, critical success factors.

3. ESSENCE OF INFORMATION TECHNOLOGY

Knowledge Economy, context, Association of KM with e-comm, customer relationship management, total quality management, benchmarking and reassurance of KM.

4. KM IMPLEMENTATION STRATEGIES

Digital dash board, Web storage system, wireless solutions, intelligent interfaces.

5. CASE STUDIES

A study and development of minimum one KM initiatives of different organizations for problem solving, conflict resolution and facing turbulence through KM.

REFERENCE:

- Knowledge Management [Tools for business development] by Dr. B. Rathan Reddy; himalaya publishing house.
- Knowledge Management Strategies, by Jerry Honeycutt; Prentice-Hall of India.
- Sowa J. F., Knowledge Representation: Logical, Philosophical, and Computational Foundations, Brooks Cole Publishing Co., 1999.
- Gonzalez A. J., and Dankel D. D., the Engineering of Knowledge-Based Systems, Prentice Hall, 1993.

(R)DIGITAL IMAGE PROCESSING AND MULTIMEDIA

1. DIGITAL IMAGE FUNDAMENTS AND IMAGE TRANSFORMS

- Introduction, An image model, sampling & quantization,
- Basic relation ships between Pixels, imaging geometry
- Properties of 2 - D Fourier transform,
- FFT algorithm and other separable image transforms.
- Walsh transforms. Hadamard, Cosine, Haar, Slant transforms,
- KL transforms and their properties.

2. IMAGE ENHANCEMENT AMD IMAGE FILTERING

- enhancement by point processing, histogram processing, spatial filtering and enhancement in frequency domain, color image processing.
- Image filtering and restoration :Algebraic approach to restoration, inverse filtering,least mean squares and interactive restoration, geometric transformations.

3. IMAGE COMPRESSION AND SEGMENTATION

- Image compression modes, error free compression, lossy compression, image compression standards.
- Detection of discontinuities, edge linking and boundary detection thresholding, region - oriented segmentation, use of motion in segmentation.
- Representation and description: Various schemes for representation, boundary descriptors and regional descriptors.
- Image reconstruction from Projections, Radon Transforms; Convolution/Filter back - Project Algorithms.

4. MULTIMEDIA SYSTEM

- Project design: setting up, requirements, navigation, storage, delivery
- Authoring tools: history, comparison of different approaches, functionality and principles
- Case study: Adobe Flash - Applications (eg. kiosks, distance learning, webbased)

5. AUDITORY INPUT AND OUTPUT

- Auditory input and output: standards and techniques - Quality of service and usability in sound.

REFERENCE:

- A.K.JAIN, " Fundamental of Digital Image Processing" PHI
- C.GONZALEX & R.E WOODS " Digital Image Processing " Addison Wesley
- Macromedia Flash MX 2004: The Complete Reference, Second Edition(Complete Reference)(for FLASH)
- Multimedia magic by S Gokul S. McGloughlin. Multimedia: Concepts and

Practice. Prentice-Hall, 2001.
- N. Chapman & J. Chapman. Digital Multimedia. Wiley, Second Edition,2004; and Digital Media
- Tools, 2nd or 3rd Editions, Wiley.

(S) ADVANCED NETWORKING AND SECURITY

1. NETWORK TOOLS AND TECHNIQUES

- Protocol layering, system design, multiple access, switching, scheduling, naming, addressing, routing, error control; flow control
- Traffic management - data link layer protocols
- Internet: concept, history, network layer, transport protocol UDP, TCP, Ipv4, Ipv6

2. LOCAL AREA NETWORKS, SOCKET AND INTERPROCESS COMMUNICATION

- Topologies, access techniques, LAN, 802.11G wireless LANs.
- Application layer: DNS, Email, WWW, multimedia.
- TCP sockets, UDP sockets name and address conversion, IPv4 / Ipv6 interoperability - Socket programming.
- Posix IPC, system V IPC, Pipes, FIFO, Posix message queen,
- System V semaphore, RPC in Sun systems. Unix programming using IPe.

3. CLASSICAL ENCRYPTION, BLOCK CIPHER AND THE DATA ENCRYPTION STANDARD

- Classical Encryption Techniques : Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Rotor Machines, Steganography.
- Simplified DES, Block Cipher Principles, The Data Encryption Standard
- Block Cipher Design Principles and Modes of Operation
- Advanced Encryption Standard : Evaluation Criteria , The AES Cipher

4. CONTEMPORARY SYMMETRIC CIPHERS AND CONFIDENTIALITY USING SYMMETRIC ENCRYPTION

- Triple DES, Blowfish, RC5,
- Characteristics of Advanced Symmetric Blick Ciphers RC4 Stream Cipher.
- Placement of Encryption function, Traffic Confidentiality, Key Distribution, Random Number generation.

5. INTRODUCTION TO NUMBER THEORY AND KEY MANAGEMENT

- Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality,
- The Chainese Remainder Theorem, Discrete Logarithms.
- Key Management, Diffe-Hellman Key Exchange, Ellipric Curve Arithmetic, Elliptic Curve Cryptography.
- Authentication applications - Electronic Mail Security, IP Security- Web Security - System Secuirty : Intruders - Malicious Software - Firewalls

REFERENCE:

- Computer Networks, A.S. Tanenbaum, PHI, 4th ed, ISBN 81-7808-785-5
- Cryptography and Network Security Third Edition William Stallings
- Cryptography and Daa Security Demming, D, Addission Wesley, 1982.

- Computer Networking A top down approach featuring the Internet, J.F.Kurose, K.W Rose, Pearson, ISBN 81-7808-247-0.
- An Engineering Approach to Computer Networks, S.Keshav, Addison Wesley, ISBN 981-235-986-9.
- Local Area Networks, G.E. Keiser, McGrew Hill, ISBN 0-07-033561-3.
- UNIX network programming, Vol I (Networking APIs: Sockets and XTI), W.Richord Stevens, PHI, ISBN 81-203-2061-1.
- UNIX network Programming, Vol II, (Interprocess Communication) Richards Slenens, PHI, ISBN 81-203-2062-X.

(T) BIOMETRICS AUTHENTICATION SYSTEMS AND EMBEDDED SYSTEMS

1. BIOMETRICS AUTHENTICATION, BIOMETRICS SENSORS

- Traditional methods for personal authentication.
- Software and hardware biometrics systems.
- Image processing and pattern recognition in living body,
- Biometric data acquisition and database.
- The related biometrics preprocessing technologies, including: image restoration, image
- Segmentation, pattern extraction and classification.

2. BIOMETRICS FEATURE , DESIGN AND IMPLEMENTATION OF SYSTEMS

- Extraction , Matching and Decision Making
- Various matching methods, including PCA and LDA.
- Introduce decision theory and their examples.
- Basic approaches of automated biometrics identification and verification systems.
- Various performance comparison and their analysis for large population authentication, accuracy and reliability of authentication in an e-world.
- Biometric Authentication Applications

3. INTRODUCTION TO EMBEDDED SYSTEM

- Embedded systems description, definition, design considerations & requirements, embedded processor selection & tradeoffs.
- Embedded design life cycle.
- Embedded Microcontrollers Microcontroller features in more detail, Criteria for choosing a microcontroller ,
- The Rabbit 3000, architecture and features , Other manufacturers of embedded microcontrollers .

4. INTRODUCTION TO THE 8051 HARDWARE

- 8051 instruction set and addressing modes ,
- 8051 Special function registers, I/O Ports,
- 8051 Timers/Counters , 8051 Serial port interface, RS-232 communication standard, 8051 Interrupts,8051 Parallel port interface

5. SWITCHES AND RELAYS

- Switch de-bouncing ^Interfacing 8051 to a keyboard/LCD ,
- Analog to Digital Conversion (ADC) and Digital to Analog Conversion (DAC)
- Interfacing 8051 to a stepper motor and external memory

REFERENCE:

- Zhang, D (ed.), 2002, Biometrics Solutions for Authentication in an e-World, Kluwer Academic Publishers, USA.
- Jain, et al., (eds), 1999, Biometrics: Personal Identification in Networked Society, Kluwer Publisher.
- The 8051 Microcontroller, I. Scott McKenzie, 3rd. Edition, Prentice-Hall.
- The 8051 Microcontroller: Architecture, Programming, and Applications K. J. Ayala, West Publishing, 1991
- The 8051 Microcontroller: Hardware, Software and Interfacing, J. W. Stewart and K. X. Miao, 2nd. Edition, Prentice-Hall, 1999.
- Sid-Ahmed, M.A., 1995, Image Processing, Theory, Algorithms, & Architectures, McGraw-Hill.
- Awcock. G.W., et al., 1996, Applied Image Processing, McGraw-Hill.

(U) NEXT GENERATION HETEROGENEOUS NETWORKS

1. NEXT GENERATION NETWORKS

- SS7 protocols and its component
- Signaling units and associate protocols such as MTPs, ISUP,SCCP,INAP,MAP
- Intelligent networks, IN conceptual model
- Capability sets, creation of services, AIN, SS7 over IP
- Soft switching, other IN architecture such as TINA , Parley.

2. NETWORK MANAGEMENT

- Network Tools and Techniques
- Study of protocol
- Concept of Traffic sharing
- Congestion Management

3. NETWORK SECURITY

- Security threats and attacks
- Security and firewall technologies
- Proxy Service
- Cryptography, hasing, DSE3, tunning protocol
- TCP/IP stack fingerprint techniques
- Introduction to IPSEC
- Public Key encryption

4. WIRELESS NETWORK

- Different wireless standard
- Standard 802.11 - frame types and formats, different physical layer transmission techniques
- Channel access and allocation, media access techniques
- Normalization contention based and contention free access
- Mobility and handoff ,mobile IP and Quality of Service
- Performance measurement ,WLAN security issue

5. MOBILE NETWORK

- Multiple access techniques
- Spread Spectrum techniques
- Cellular mobile phone architecture
- Frequency assignment and channel reusability
- Access algorithms to the share control channel ,mobility and handover
- Introduction to VoIP
- VoIP switch Asterisk ,Analysis of SIP signalization
- VoIP gateway configuration , Analysis of H.323 signalization -Gatekeeper
- VoIP telephony quality, QoS

REFERENCES:

- Computer Networks, A.S. Tanenbaum, PHI, 4th ed, ISBN 81-7808-785-5
- Computer Networking A top down approach featuring the Internet, J.F.Kurose, K.W Rose, Pearson, ISBN 81-7808-247-0.
- An Engineering Approach to Computer Networks, S.Keshav, Addison Wesley, ISBN 981-235-986-9.
- HERSENT, O. - PETIT, J. P. - GURLE, D.: Beyond VoIP Protocols:
- Understanding Voice Technology and Networking Techniques for IP Telephony John Wiley & Son Ltd, 2005.
- RAAKE, A.: Speech Quality of VoIP:Assessment and Prediction John Wiley & Son Ltd, 2006.
- Mobile Computing , Dr. N.N.Jani ,Dr. Ashish N. Jani, Neeta Kanabar, Kamaljit Lakhtaria

M. PHIL. (PRACTICAL) (IT/CS) ADVANCED JAVA

UNIT - I

Fundamentals of object-oriented Programming: Introduction , Object-Oriented Programming , Basic concepts of object-oriented programming, Benefits of OOP, Applications of OOP.JAVA Evolution: Java History, Java Features, How Java differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. review of Java Language: Introduction, Simple Java Program, More of Java, An application with two classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java virtual machine, command line arguments, Programming style, Constant, variable and making, Branching & looping.

UNIT -II

Classes, Objects and Methods : Introduction, defining a class, adding variables, adding variables, adding methods, creating objects, accessing class members, constructors, methods overloading, static members, nesting of methods, Inheritance: extending a class, overriding methods, final variables and methods, final classes, Finalize method, Abstract methods and classes, visibility control.

Arrays, Vectors: Arrays, one-dimensional arrays, creating an array, two dimensional arrays, vectors, wrapper classes.

UNIT - III

String Handling: - The string constructors, string benefit, special string operation character extraction, string comparison, searching string, modifying, string buffer.

UNIT - IV

Exception Handling Fundamentals, Exception types uncaught exception, using try & catch, multiple catch clauses, nested by statement, thou, throws, finally, Java's built in exceptions running your own exception sublimes .

UNIT-V

INTERFACE: Multiple Inheritances: Introduction, defining interfaces, extending inter-Faces, implementing interfaces, accessing interface variables.

PACKAGE :Putting classes together : Introduction, java API packages, Packages, naming conventions, creating packages, accessing a package, using a package, adding a class to a package, hidings classes.

Multithreaded Programming : Introduction, creating threads, extending the thread class, stopping and blocking a thread, life cycle of thread, using thread methods, thread exception, thread priority, synchronization, implementing the 'Run able' Interface.

STUDY : Applet programming, JSP, Servlet, JAVA BEAN, JDBC.

DISSERTATION

Students individually will carry out a detail study on a topic and implement a related system. The study must include literature survey, methodology and proposed work, experimental details and results, modifications to be included and future directions, applications etc. A report is to be prepared and submitted under the guidance of a supervisor. The report should contain design, implementation and experimental details. The topics involved in the work should be related to the courses undertaken by the student till this portion of progression under the programme and have contemporary relevance. It can involve research and development oriented works and be carried out with an eye on the needs of the industry. The work must be defended through a presentation in front of a panel constituted by selected experts. The quality of the work should be reflected by at least one publication in conference proceedings/ journals etc.