

**M.TECH IN COMPUTER SCIENCE AND ENGINEERING
(DISTRIBUTED COMPUTING SYSTEMS)**

CURRICULUM AND SYLLABUS

(Effect from the Academic Year 2007 – 08)

PONDICHERRY UNIVERSITY
PUDUCHERRY – 605014.

M.TECH IN COMPUTER SCIENCE AND ENGINEERING (DISTRIBUTED COMPUTING SYSTEMS)

COURSE CURRICULUM AND SCHEME OF EXAMINATION

(Minimum Credit Requirement for the completion of the Programme: 72)

ELIGIBLE:

M.Tech. in Computer Science and Engineering (Distributed Computing Systems): Candidates for admission to the first semester of four semester M.Tech. Course in Computer Science and Engineering with specialization in Distributed Computing Systems should have passed B.E./B.Tech. in Computer Science and Engineering / Information Technology or MCA (or) an examination of any University or Authority accepted by the Pondicherry University as equivalent thereto, with at least 55% marks in the degree examination or equivalent CGPA .

SEMESTER – I

Sl. No.	Code	Subject Software Architecture Software Architecture	Hours / Week			Credits	Evaluation (marks)		
			L	T	P		Internal	External	Total
1.	CS 901	Design of Operating Systems	3	1	0	4	40	60	100
2.	CS 902	High Performance Computing	3	1	0	4	40	60	100
3.	CS 903	Software Architecture	3	1	0	4	40	60	100
4.	CS 904	High Speed Networks	3	1	0	4	40	60	100
5.		Elective – I	3	0	0	3	40	60	100
6.	CS 907	Advanced Software-Laboratory- I	1	0	3	2	50	50	100
						20	250	350	600

SEMESTER – II

Sl. No.	Code	Subject	Hours / Week			Credits	Evaluation (marks)		
			L	T	P		Internal	External	Total
1.	CS 905	Advances in Databases	3	1	0	4	40	60	100
2.	CS 906	Network Management and Security	3	1	0	4	40	60	100
3.		Elective – II	3	0	0	3	40	60	100
4.		Elective – III	3	0	0	3	40	60	100
5.		Elective –IV	3	0	0	3	40	60	100
6.		Elective – V	3	0	0	3	40	60	100
7.	CS 908	Advanced Software – Laboratory-II	0	0	3	2	50	50	100
						23	290	410	700

SEMESTER – III

Sl. No.	Code	Subject	Hours / Week			Credits	Evaluation (marks)		
			L	T	P		Internal	External	Total
1.		Elective – VI	3	0	0	3	40	60	100
2.		Elective – VII	3	0	0	3	40	60	100
3.	CS 961	Directed Study	0	0	6	3	100	---	100
4.	CS 909	Dissertation Project (Phase I)	0	0	24	8	200	100	300
						17	380	220	600

SEMESTER – IV

Sl. No.	Code	Subject	Hours / Week			Credits	Evaluation (marks)		
			L	T	P		Internal	External	Total
1.	CS 910	Dissertation Project (Phase II)	0	0	36	12	250	150	400
						12	250	150	400

List of Elective Subjects

SL.NO.	Code	SUBJECT
1	CS921	Advanced Computer Architecture
2	CS922	Advances in Software Engineering
3	CS923	Cluster Computing
4	CS924	Component Technology
5	CS925	Computer Vision and Image Processing
6	CS926	Data Compression
7	CS927	Data Mining and data warehousing
8	CS928	Design of Knowledge based Systems
9	CS929	Evolutionary Computing
10	CS930	Mobile Communication Networks
11	CS931	Multimedia Systems
12	CS932	Network Protocols
13	CS933	Optical Communication Networks
14	CS934	Real Time Computing and Communications
15	CS935	Software Metrics
16	CS936	Software Reengineering
17	CS937	Web Technology and Internet Programming

CS 901 DESIGN OF OPERATING SYSTEMS

UNIT- I

Fundamentals of distributed computing - Distributed computing models - Issues in distributed OS - Network types - LAN and WAN technologies - communication protocols - Internetworking - ATM technologies - Unix operating system - General overview of the system - Introduction to the Kernel - Internal representation of files - The structure of processes - Process control - Inter process communication- Distributed Unix System.

UNIT- II

Message passing in IPC- Issues in IPC by message passing – Synchronization – Buffering – multi-datagram messages - Encoding and Decoding messages- Process addressing - failure handling - group communication- Remote procedure calls - The RPC model - transparency of RPC model - Implementing RPC mechanism - stub generation - RPC marshaling arguments and results - Server Management - Parameter Passing semantics- Call semantics - Communication protocols - complicated RPCs - client-server Binding - exception handling – security - types of RPCs - Case Studies - Sun RPC, DCE, RPC - Distributed shared memory - Architecture of DSM – granularity - structure of DSM - consistency models - replacement strategies- thrashing - heterogeneous DSM.

UNIT- III

Synchronization - clock synchronization - event ordering - mutual exclusion – Deadlocks - election algorithms - Resource management - desirable feature of a good global scheduling algorithms - task assignment approach- load balancing - load sharing - process management - process migration - threads.

UNIT- IV

Distributed file systems - desirable features of good DFS - file models - file accessing models - file sharing semantics - file caching schemes - file replication - fault tolerance - atomic transactions - design principles - case study: DCE DFS - Naming - good naming system - terminologies and concepts - system-oriented names- object-locating mechanisms - human-oriented names - name caches - naming and security - DCE directory service - Security - cryptography - authentication - access control - digital signature - design principles - DCE security service.

UNIT- V

Case studies - Amoeba - V-System - Mach - Chorus.

REFERENCE BOOKS :

1. Maurice J.Bach, The Design of UNIX Operating Systems, PHI, 1988.
2. Pradeep K. Sinha, Distributed Operating Systems, PHI, October 2001
3. Abraham Silberschatz, Peter B.Galvin, G.Gagne "Operating System concepts", sixth Edition, Addison Wesley Publishing Co., 2003.
4. Charles Crowley "operating Systems: A Design-oriented Approach", Tata McGraw-Hill, 1998.

5. Andrew S. Tanenbaum, "Modern Operating Systems" Second edition, Addison Wesley Publishing Co., 2001.

CS902 HIGH PERFORMANCE COMPUTING

UNIT - I

INTRODUCTION : Historical progression leading to current state – types of parallelism including temporal, data and functional. Instructional level parallelism – pipelined processors – super scalar processors – VLIW processors – multithreaded processors – proposed future processors including trace, multiscalar and super flow – case studies.

UNIT - II

PARALLEL ARCHITECTURES : Classification – inter connection networks – vector computers – shared memory parallel computers – cache coherence – distributed shared memory parallel computers – message passing parallel computers – cluster of workstations.

UNIT - III

PARALLEL ALGORITHMS : Models of parallel computation including PRAM, combinational circuits, inter connection networks, BSP-Log P – design and analysis of algorithms for a wide variety of computational problems.

UNIT - IV

PARALLEL PROGRAMMING : Models including message passing – shared memory data parallel – message passing libraries – including PVM and MPI – High performance Fortran (HPF)

UNIT - V

COMPILER TRANSFORMATIONS AND PERFORMANCE EVALUATION: Dependence analysis – loop transformations – transformations for parallel computers including data layouts, computational and communication optimization.

Performance Metrics –performance laws – scalability – performance measurement books

REFERENCE BOOKS:

1. Selim G.Akl – The design and analysis of parallel algorithms – Prentice Hall International Inc, 1989.
2. Hwang K. Briggs F.A. – Computer Architecture and parallel processing – Mcgraw Hill – 1985.
3. Angel L.Decegama – The technology of parallel processing, parallel processing architecture and VLSI Hardware Vol I – Prentice Hall Engle wood cliffs new Jersey 1989.
4. Michael J.Quinn, Parallel computer theory and practice McGraw Hill 2nd Edition 1994.
5. V.Rajaraman and C.Siva Ram Murthy, Parallel computers architecture and programming, Prentice Hall of India, India 2000.

6. C. Siva Ram Murthy, K.N. Balasubramanya Murthy and A.Srinivas New Parallel Algorithms for Direct Solution of Linear Equations – John Wiley & Sons Inc, USA 2001.
7. K. Hwang and Z.Xu, Scalable Parallel Computing: Technology, Architecture and Programming, WCB/McGraw –Hill Inc., USA 1998.

CS903 SOFTWARE ARCHITECTURE

UNIT - I

Introduction to Software Architecture – The Software Product Life Cycle - The Architecture Design Process – Introduction to Software Design – Architecture Representation – Quality Models and Quality Attributes – Architectural Design Principles

UNIT - II

Architectural Patterns – Patterns and Software Architecture – The Unified Process: Use Case Driven, Architecture Centric, Iterative, and Incremental – The Four Ps: People, Project, Product, and Process in Software Development – A Use Case Driven Process – An Architecture Centric Process

UNIT - III

Open Distributed Processing, Architecture – Architecting of Software – Intensive Distributed Processing Systems – Architecture Specification – History of RM-ODP – Motivation of RM-ODP – Benefits Achievable from using RM-ODP – How RM-ODP is used – How RM-ODP facilitates Business Specification – RM-ODP Elements for Use– RM-ODP Concepts and techniques for use.

UNIT - IV

RM-ODP Architectural model Overview – Using RM-ODP – View Points – Architecture Specification and Representation – Components – composition and decomposition – Mismatch through Behavior Specification – RM-ODP Functions (Management Functions, Coordination Functions, Repository Functions, Security Functions) – Distribution Transparencies, Viewpoint mechanisms, Conformance and Compliance Testing.

UNIT - V

Evaluating a Software Architecture – The ATAM – Method for Architecture Evaluation – Understanding Quality Attributes – Using the SAAM to evaluate an Architecture (Overview of SAAM steps of a SAAM evaluation A simple SAM agenda) – ARID – An evaluation method for partial architectures (Active Design reviews, Steps of ARID) – Comparing software Architecture Evaluation methods

REFERENCE BOOKS:

1. Stephen T Albin, The Art of Software Architecture, Wiley, 2003 (UNIT-I, 1-82, 151-188)
2. Frank Buschmann, Pattern Oriented Software Architecture, Wiley, 2002 (UNIT-II, 25-193, 383-411)
3. Ivar Jacobson, Grady Booch, and James Rumbaugh, The Unified Software Development Process, Addison Wesley Longman, 2002 (UNIT-II, 1-84)
4. Janis R Putman, Architecting with RM-ODP, Prentice Hall of India, 2000 (UNIT-III & IV, 3-125,159-451)
5. Paul Clements, Rick Kazman and Mark Klien, Evaluating Software Architectures, Addison Wesley, 2000 (UNIT-V, 19-78,109-124,211-273)

CS904 HIGH SPEED NETWORKS

UNIT- I

Introduction to computer networks - Review of OSI/ISO model – High speed LANs – Fast Ethernet - Switched Fast Ethernet - Gigabit Ethernet – ISDN – FDDI - Frame Relay – operation and layers.

UNIT- II

Introduction to SONET – Multiplexing – SONET/SDH Layers – SONET Frame Structure – Sonet Physical Layer.

Introduction ATM – Cell format and Switching Principles – Switch Architectures – Protocol Architecture – Service categories.

TCP/IP protocol Suite – IP Packet Header – TCP packet header – User services – Protocol Operation – Connection Establishment – UDP.

UNIT- III

Congestion control in Data Networks and Internets – Effects of Congestion – Congestion Control in Packet Switched Networks.

Frame relay Congestion Control – Traffic rate Management – Congestion Avoidance.

ATM Traffic and Congestion Control – Attributes – Traffic Management Framework – Traffic Control – ABR Traffic Management.

TCP Traffic Control – Flow Control – TCP Congestion Control – Timer Management – Window Management.

UNIT-IV

Quality of Service - Integrated Service Architecture (ISA) – Random Early Detection – Differentiated Services – Protocols for QoS support - Resource Reservation (RSVP) – Multiprotocol Label Switching (MPLS) – Real-Time Transport Protocol (RTP).

UNIT- V

Introduction to Optical networks – Wavelength division multiplexing (WDM) – Introduction to broadcast-and-select networks - Switch architectures - channel accessing – Wavelength routed networks – Switch architectures - Routing and wavelength assignment – virtual topology design– IP over SONET over ATM over WDM – IP over ATM over WDM – IP over WDM.

REFERENCE BOOKS:

1. William Stallings, High-Speed Networks and Internets, 2nd Edition, Pearson Education, 2002. (Unit I, II, III, and IV)
2. Fred Halsall, *Multimedia Communications: Applications, Protocols, and Standards*, Pearson Education Asia, 2001. (Unit I and II)
3. Rajiv Ramaswami and Kumar N. Sivarajan, *Optical Networks: A Practical Perspective*, 2nd Edition, Morgan Kaufmann (Elsevier Indian Edition), 2004. (Unit II and V).
4. C. Siva Ram Murthy and Mohan Gurusamy, *WDM Optical Networks: Concepts, Design, and Algorithms*, PHI, 2002. (Unit V)
5. Laon-Garcia and Widjaja, *Communication Networks: Fundamental Concepts and key Architectures*, Tata McGrawHill, 2000.

6. Behrouz A. Forouzan, *Data Communications and Networking*, 2nd edition, Tata McGraw-Hill, 2000
7. Stamatios V. Kartalopoulos, *Understanding SONET/SDH and ATM: Communications Networks for Next Millennium*, Prentice-Hall of India, 2001.

CS905 ADVANCES IN DATABASES

UNIT – I

Entity-Relationship model – Relational Model – Relational Constraints - Relational Algebra – Tuple and Domain Relational Calculus – SQL – QUEL – QBE – Design Algorithms – Dependencies - Normal Forms – ER and EER to Relational mapping – JDBC-ODBC.

UNIT – II

Query Processing basics and optimization – Heuristic Optimization – Cost, Size Estimation - Models of Transactions – Properties of Transactions – Concurrency Control – Recovery – Security and Authorization – Storage – Indexing and Hashing – ISAM – B-Trees – Kd Trees – X Trees – Dynamic Hashing.

UNIT – III

Distributed Databases – Principles – Design – Queries – Translation of Queries – Optimization Access Strategies – Management of Distributed Transactions – Concurrency Control – Reliability

UNIT – IV

Object Oriented Concepts – Data Object Models – Object Based Databases – Object Oriented Databases – Persistence – Issues in OODBMS - Object Oriented Relational Databases – Object Definition Languages – Object Query Languages – SQL3 - Concurrency in OODBs – Storage and Access – Data Access Interface Technologies – ADO – RDO - CORBA.

UNIT – V

Enhanced data models for Advanced applications - Multimedia Databases – Parallel Databases – Data Mining – Data warehousing – Spatial Database Concepts – Temporal Database Concepts – Active Databases -.Web databases – The Web as a database application platform – Scripting Language

REFERENCE BOOKS:

1. Abraham Silberchatz, Henry F. Korth, S.Sudarsan, "Database System Concepts", Fifth Edition, McGraw-Hill, 2006.
2. Ramez Elmasri & Shamkant B. Navethe, "Fundamentals of Database Systems", fourth Edition, Pearson Education, 2004.
3. Thomas M. Connolly, Carolyn E. Begg, " Database Systems – A Practical Approach to Design, Implementation and Management", Third edition, Pearson Education, 2003.
4. Jeffrey D. Ullman, Jenifer Widom, "A First Course in Database Systems", Pearson Education Asia, 2001.
5. Stefano Ceri, Giuseppe Pelagatti, "Distributed Databases Principles and Systems", McGraw-Hill International Editions, 1985.

6. Rajesh Narang, "Object Oriented Interfaces and Databases", Prentice Hall of India, 2002.

CS 906 NETWORK MANAGEMENT AND SECURITY

UNIT - I

Network Management goals, Organization, and functions – Network monitoring – Network control – SNMPv1 Network management organization and communication function models – structure of SNMP management information – standards – SNMPv2 system architecture – protocol – protocol specification – SNMPv3 architecture.

UNIT- II

Remote Network monitoring – concepts – group management – RMON alarms and filters – packet capture group – practical issues – RMON2 protocol – practical issues – ATM network management – Telecommunication network management – TMN conceptual model – architecture – Network management applications.

UNIT- III

Need for encryption – definitions – encryption techniques – simplified DES – differential and linear cryptanalysis – Triple DES – RC5 – Public-Private Key (PPK) cryptography – Hash and Mac Algorithms – Digital certificates – Digital signatures and authentication protocols – Cryptographic Algorithms in SNMPv3.

UNIT- IV

Intruders – Viruses, worms, and related threats – Firewalls – Design Principles – Trusted systems – web security requirements – secure sockets – IP security overview – IP security architecture – key management – security management – SNMP-based security. Internet security – threats to privacy – packet sniffing – spoofing – Fraudulent information collection – fundamental elements of security – security assurance concepts – security technologies – Physical security – logical security – application layer security – deterring threats

UNIT – V

Security protocols – Transport layer protocols – SSL – Application layer protocols – E-mail based – PGP – S/MIME security protocols – Electronic payments protocols – SET – Proxy payments – Shopping experience protocols – Open trading protocols (OTP) – open buying on Internet (OBI) – Internet banking protocols – Open financial exchange (OFX) – Electronic bill presentation and payment (EBPP) – SNMPv3 Security model and protocol.

Reference Books:

1. Juanita Ellis, Tim Speed, and William Crowal, *The Internet Security Guidebook: From Planning to Development*, 2001
2. Mani Subramanian, *Network Management : Principles and Practice*, Addison Wesley, 2000.
3. Mark S. Merkow, Ken L. Wheeler, and James Breithaupt, *Building SEI Applications for Secure Transactions*, 2000
4. Moshe Rozenblit, *Security for Telecommunications Network Management*, Prentice Hall India, 2000
5. William Stallings, *Cryptography and Network Security: Principles and Practice*, 2nd Edition, Prentice Hall 2000
6. William Stallings, *Network Security Essentials: Applications and Standards*, Pearson Education Asia 2001

7. William Stallings, SNMP, SNMPv2,SNMPv3, and RMON1 and 2,3rd Edition, Person Education Asia, 1999.

CS907 ADVANCED SOFTWARE LABORATORY I

1. Development of programs using Software Architectural Styles
2. Development of library information system by adopting RM-ODP standard
3. Development of programs using Design Patterns
4. Development of internet based online shopping system
5. Two way communication using TCP and UDP
6. Development of Simple Web Server
7. File Transfer using TCP
8. Implementation of page replacement algorithm
9. Implementation of Scheduling algorithms
10. Implementation of parallel sorting algorithm (simulation)

CS908 ADVANCED SOFTWARE LABORATORY II

1. OOPs Metrics calculation
2. Simulation of multiplexing techniques
3. Simulation of Analog modulation
4. Simulation of Digital modulation
5. Development of application using CORBA
6. Development of application using DCOM
7. Development of simple Web Services
8. implementation of Chat Server Application
9. Implementation of SDES and RSA algorithm
10. Implementation of Query Optimization techniques

CS921 ADVANCED COMPUTER ARCHITECTURE

UNIT – I

Computational Models - the concept of computational model – basic computational models – the concept of computer architecture – interpretation of the concept of computer architectures at different levels of abstraction. Introduction to Parallel Processing: basic concepts – program, process and threads in languages – concept of concurrency and parallel execution – types and levels of parallelism – classification of parallel architectures – basic parallel techniques –pipelining and replication – an overview of parallel processing applications.

UNIT – II

Instruction-level Parallel processors - evolution and overview of ILP – dependencies between instructions – data, control and resource dependencies – instruction scheduling – preserving sequential consistency – Pipelined Processors – basic concepts – design space of pipelines – case study - pipelined instruction processing in the Pentium processor and PowerPC 604. VLIW Architectures – basic principles – case study: the Trace 200 family.

UNIT – III

Memory Organizations - basic naming, allocation and accessing techniques – name mapping implementations – name translation before program execution – name translation by an executing program – operating system controlled address translations – segmentation, paging and paged segments – the processor-memory interface – memory management units, cache memory, memory interleaving, memory bandwidth and granularity – memory organizations for array processors – contentions in shared memory architectures – memory structure of SPARC, ALPHA AXP and MC680x0 architectures - Characteristics of I/O subsystems – Interrupt mechanisms and special hardware – I/O Processors and I/O channels.

UNIT – IV

Vector Architectures - vectorization methods – pipelining - parallel computing streams –CRAY C90 – architecture, memory organization, system interconnections, CPU architecture, vector processing, technology and software - Multithreaded architectures: Introduction, computational models – von Neumann based multi-threaded architectures – data flow architectures – hybrid multi-threaded architectures.

UNIT – V

Distributed Memory MIMD architectures - direct interconnection networks – topologies, switching techniques, routing – Fine-grain systems – medium-grain systems – internal structure of T9000 transputer, process management, channel communication inside and between neighborhood transputers, T9000 based machines – Coarse-grain multi computers. Shared Memory MIMD architectures - dynamic interconnection networks - shared path and switching networks – cache coherence – synchronization and event ordering in multi-processors – Uniform memory Access (UMA), Non-Uniform Memory Access (NUMA), Cache-coherent non-uniform memory access (CC-NUMA) and Cache-only memory architectures (COMA) machines.

REFERENCE BOOKS:

1. Angel L.DeCegama, Parallel Processing Architectures and VLSI hardware, Prentice Hall Inc., 1989.
2. Kai Hwang, Faye'A.Briggs, Computer Architecture and parallel processing, McGraw-Hill International editions, 1985.
3. Richard Y.Kain, Advanced Computer Architecture – A systems design approach, Prentice-Hall India, 2001.
4. Sima, Fountain, Kacsuk, Advanced Computer Architectures – A design space approach, Addison Wesley, First Indian Reprint, 2000.

CS922 ADVANCES IN SOFTWARE ENGINEERING

UNIT - I

Review of software development techniques: Life cycle models: water fall, prototyping , rapid application development, spiral model.

Development Approach: Object oriented Analysis and Design - Artifacts

UNIT - II

Management through Metrics: Theory of measurements: The need for measurement, the basics of measurement, a goal based frame work for measurement, data collection and analyses

Project size estimates, theoretical and algorithmic cost estimation models, cost metrics and process metrics, comparison of cost estimation models, quality models, and risk analysis models

UNIT - III

Process Modeling: Need for Process Modeling- system dynamic modeling - techniques and languages- Software Engineering Institute Process Capability Maturity Model - Standards ISO 9001

Software Architecture: Introduction - Architecture Styles- Architecture for distributed applications - Case study for Instrumentation Software, Mobile Robotics, and Cruise control

UNIT - IV

Extreme programming- 12 policies- Extreme Programming for mobile, embedded and distribution applications - Planning of Extreme Programming- tools for extreme programming

UNIT - V

Software Engineering for agent based systems - client server systems – web based system - real time systems

REFERENCE BOOKS:

1. M.Shaw and D. Garlan, " Software Architecture: Perspectives on an Emerging Discipline ", Printice Hall of India Privated Limited , New Delhi 2000.
2. N.E. Fenton and S.L. Pfleeger, " Software Metrics : A rigorous and practical approach" second edition, PWS publishing company, 1999.
3. K.Beck and M. Fowler, " Planning Extreme Programming" Addison Wesley Publishing Co. , 2000.

4. "Java Tools for Extreme Programming: Mastering Open source Tools including Ant, Junit and Cactus ", John Wiley Sons, 2001
5. R.S. Pressman, "Software Engineering: A practitioner's Approach", McGraw Hill.
6. Ian Sommerville " Software Engineering", Addison Wesley, 8th Edition.

CS924 COMPONENT TECHNOLOGY

UNIT I

Client/server computing- building blocks-types of servers-types of clients- types of middleware-aspects of client/server systems- sizing-scalability- tiered architecture-client/server models- Requirements of client/server systems-Distributed objects-benefits-drawbacks-from distributed objects to components

UNIT II

Component technology- components- definitions- properties-benefits-components and interfaces- direct and indirect interfaces- versions- interfaces as contracts-callbacks-forms of design level reuse- connection oriented programming-connectable objects-component architecture- component frameworks- composition- data driven, contextual, aspect oriented programming, subject oriented programming, XML components-component development- assembly.

UNIT III

The Microsoft way-component object model- From COM, COM+, DCOM to .NET framework-evolution- web services technologies-XML,WSDL,UDDI,SOAP-Common Language Infrastructure-Common Language Runtime-.NET framework class library-ADO.NET,ASP.NET-enterprise services.

UNIT IV

The Sun Way-component variety – applets, servelets, java beans, enterprise beans-EJB architecture- types of beans- characteristics-Building and deploying distributed applications using EJB-Java and web services-JXTA and jini.

UNIT V

The OMG way-system object model- CORBA timeline-CORBA architecture-ORB-services-facilities-business objects-IIOP-transport mechanisms- IDL-Drawbacks of CORBA -CORBA component model- POA-CCM components- CCM containers-Meta Object Facility.
Comparison of CORBA, .NET and EJB.

References:

1. Clemens szyperski,Dominik Gruntz and Stephan Murer ,'Component Software beyond object oriented programming' third edition, Pearson education,2004.
2. Robert Orfali,Dan Harkey,Jeri Edwards,'Client/ Server Survival Guide' Third edition,John wiley Inc,2003.
3. David Chappell, 'Understanding .NET', Pearson Education Inc, 2002.
4. Bill Burke, Richard Monson-Haefel, 'Enterprise JavaBeans', Fifth Edition, O'Reilly, 2001.
5. Dan harkey, Robert Orfali,'Client/Server programming with JAVA and CORBA', second edition, Wiley & sons Inc, 1999.

CS925 COMPUTER VISION AND IMAGE PROCESSING

UNIT – I

Digital Image Fundamentals: Digital Image Representation – Functional Units of an Image processing system. Visual perception – Image Model – Image sampling and Quantization – grayscale resolution – pixel relationships – Image geometry. Image Transforms – Unitary transform, Discrete Fourier Transform, Cosine Transform, Sine Transform, Hadamard Transform, Slant and KL Transform.

UNIT – II

Image Enhancement: Methods of Enhancement – Histogram processing – Spatial operations – Image smoothing – Image sharpening – Color Image processing methods – Color Image Models.

UNIT – III

Image Restoration and Compression: Degradation Model – Discrete Formulation – Circulant matrices – Constrained and Unconstrained restoration geometric transformations – spatial transformation fundamentals – Compression Models – Error Free Compression – Lossy Compression – International Image Compression Standards.

UNIT – IV

Image analysis and Computer Vision: Spatial feature Extraction – Transform features – Edge detection – Boundary extraction – Boundary Representation – Region Representation – Moment Representation – Structure – Shape Features – Texture – Scene Matching and Detection – Image Segmentation – Classification techniques – Morphology – Interpolation.

UNIT – V

Sensing 3D shape: how the 3rd dimension changes the problem. Stereo 3D description, 3D model, matching, TINA. Direct 3D sensing – structured light, range finders, range image segmentation.

Emerging IT applications: Recognition of Characters, fingerprints and faces – Image databases.

REFERENCE BOOKS:

1. Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 2000.
2. Boyle R & Thomas R, Computer Vision – A First Course, 2nd Edition, McGraw Hill, 1990.
3. Gonzalez C and Richard E. Woods, Digital Image Processing, Addison Wesley, 1995.

4. Parker JR, Algorithms for Image Processing and Computer Vision, Wiley Eastern, 1997.
5. Rafael C. Gonzalez and Paul Wintz, Digital Image Processing, Addison Wesley, 1996.

CS923 CLUSTER COMPUTING

Unit- I

Introduction – Clusters - need for clusters - comparison with parallel and distributed systems - examples - Hardware – structure - communication requirements - cluster acceleration techniques - UMA, NUMA, NORMA, CC-NUMA - Cluster setup - Cluster Administration - Dependable Clustered Computing – Meta Computing Systems, Services, Resources – Performance models – Simulation.

UNIT- II

Single system image – Boundaries, levels – Single system – Application – Kernel – Hardware - Networking, Protocols and I/O – High speed networks – messaging systems – Xpress transport protocol – load balancing – congestion management in ATM clusters – Parallel I/O– methodologies and systems - RAID – Parallel file systems- Network RAM – Distributed shared memory – Multiple path communication.

UNIT- III

Process Scheduling, load sharing and balancing – Symmetric multiprocessors – job and resource management systems-scheduling parallel jobs – parallel program scheduling techniques – mapping and scheduling heterogeneous systems – load sharing and fault tolerance management – dynamic load balancing.

UNIT- IV

Object oriented implementation of parallel genetic algorithms – MPI and PVM programming – time management in parallel simulation – Climate Ocean modeling – Biomedical applications modeling - Bench marks – Cost issues – cluster operating systems – standards.

UNIT- V

Representative cluster systems – Beowulf – Introduction – history – philosophies – drivers – implementation issues - Exploiting Cluster networks for distributed object groups and collective operations - A generic middleware based platform for scalable cluster computing.

Clustering algorithms for homogeneous and heterogeneous systems

REFERENCE BOOKS:

1. Gregory F.Pfister, In Search of Clusters, 2nd edition, Prentice Hall PTR, 1998.
2. Rajkumar Buyya , High performance cluster computing : Architecture and systems, Volume 1 , 1st edition, Prentice Hall, USA1999.
3. Rajkumar Buyya , High performance cluster computing : Programming and applications, Volume 2 , 1st edition, Prentice Hall, USA, 1999.
4. F.De Turck, S.Van Hastel, B.Volckaert, P.Demeester, "A generic middleware based platform for scalable cluster computing", Future Generation Computer Systems(FGCS), Vol.18, PP. 549-560, 2002.
5. Jorg Nolte, Mitsuhsa Sato, Yutaka Ishikawa "Exploiting Cluster Networks for distributed object groups and collective operations" , Future Generation Computer Systems(FGCS), Vol.18, PP. 461-476, 2002.

6. Karl Heinz Hoffmann, Arnd Meyer "Parallel algorithms and cluster computing: Implementations, algorithms and applications, 1st edition, Springer, 2006.

CS926 DATA COMPRESSION

UNIT – 1

COMPRESSION BASICS:

Definition – lossless compression - lossy compression - modeling and coding – compression measure - Shannon's source coding and channel coding theorems – Types of redundancy - transform coding – predictive coding – applications.

UNIT – 2

TEXT COMPRESSION:

Information theory concepts – entropy - Shannon-Fano coding – Huffman coding – arithmetic coding – dictionary-based coding – LZ77 – LZ78 – LZW – BWT - context-based coding.

UNIT – 3

AUDIO COMPRESSION:

Basics of digital audio – audio file formats (WAV, MIDI) - ADPCM in speech coding – vocoders – LPC – CELP – MELP – scalar quantization – vector quantization – Linde-Buzo-Gray algorithm - DPCM – MPEG audio compression.

UNIT – 4

IMAGE COMPRESSION:

Basics of digital image – image file formats (BMP, GIF, TIFF) – Colour models in images - Discrete Fourier Transform – Discrete Cosine Transform – Discrete Wavelet Transform – Sub band coding - EZW – SPIHT – EBCOT - Image compression standards: JBIG, JPEG and JPEG 2000.

UNIT – 5

VIDEO COMPRESSION:

Basics of digital video – video file formats (AVI, YUV) – colour models in video – motion estimation and compensation - Video compression standards: MPEG-1, MPEG-2, MPEG-4, H.261, H.263 and H.264/AVC.

REFERENCE BOOKS:

- [1] Mark Nelson and Jean-Loup Gailly, "The Data Compression Book," 2nd Edition, M&T Books, New York, 1996.
- [2] K. R. Rao and J. J. Hwang, "Techniques and standards for image, video and audio coding," Prentice Hall Inc., New Jersey, 1996.
- [2] Khalid Sayood, "Introduction to Data Compression," 2nd edition, Harcourt India Private Ltd., New Delhi, 2000.
- [3] Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia," Pearson Education, New Delhi, 2004.
- [4] David Salomon, "Data Compression: The Complete Reference," 3rd Edition, Springer International Edition, New Delhi, 2005.

CS928 DESIGN OF KNOWLEDGE BASED SYSTEMS

UNIT - I

Artificial Intelligence – Introduction – Intelligent Agents – Problem Solving – Knowledge and Reasoning - First-order Logic –Uncertainty –Learning - Knowledge Base - Inference in First-Order Logic - Logical Reasoning – Semantic Nets – Frames - Agents – Perception – Robotics – Knowledge Engineering.

UNIT - II

Expert Systems – Introduction – Knowledge Representation – Methods of Inference – Cognition Models - Learning and Uncertainty – Reasoning – Design – Pattern Matching - Rule Based Languages – Expert System Design Examples –Acquiring knowledge from multiple experts using graphical representation– Development Tools – Case Studies.

UNIT - III

Knowledge Based System – Logic - Ontology - Knowledge Representation - Processes - Purposes, Contexts, and Agents - Knowledge Soup - Knowledge Acquisition and Sharing . Case Studies – GERMAT (Generalized Event Representation Modeling and Analysis Tool). GAPATS (General Aviation Pilot Advisor and Training System), Database systems techniques and tools in automatic knowledge acquisition for rule based expert systems, Dynamic construction of knowledge based systems.

UNIT - IV

Application development using Visual LISP - PROLOG – Propositional facts – Rules – Queries – Unification – Propagation – Accumulation – AND / OR Control Flow – NOT – Declarative and Procedural Semantics .

UNIT - V

Machine Learning - Introduction - Concept Learning and the General-to-Specific Ordering - Decision Tree learning - Artificial Neural Networks - Evaluating Hypotheses - Bayesian Learning - Computational learning Theory - Instance-Based Learning - Inductive Logic Programming - Analytical learning - Combining Inductive and Analytical Learning - Reinforcement Learning.

REFERENCE BOOKS:

1. Knowledge based systems - Techniques and applications, Volume 1, 2, 3 &4, Cornelius T.Leondes, Academic press, Newyork, 2000
- 2.T. R Addis, Designing Knowledge Based Systems , Kogan Page Ltd., 1986.
3. Guy L. Steele J.R, Common Lisp, 2nd Edition, Digital Press ISBN: 155580416, May 1990
4. Joseph C. Giarratano, Expert Systems: Principles and Programming, 3rd edition, Brooks/Cole Pub Co, ISBN: 0534950531, February 9, 1998.
5. John F. Sowa , David Dietz , Knowledge Representation: Logical, Philosophical, and Computational Foundations, 1st edition Publisher: Brooks/Cole Pub Co, ISBN: 0534949657, August 17, 1999.

- 6.. Robert A. Mueller, Rex L. Page, Symbolic Computing With Lisp and Prolog, Publisher: John Wiley & Sons; ISBN: 0471607711, November 1988.
7. Tom M. Mitchell, Machine Learning, McGraw-Hill Higher Education; ISBN: 0070428077, March 1, 1997.

CS930 MOBILE COMMUNICATION NETWORKS

UNIT- I

Fundamentals of wireless technology – Signal encoding techniques – Spread spectrum – Satellite communications – Introduction to emerging technologies

UNIT-II

GSM - architecture - Cellular transmission principles – Typical cell layout – Signals – Transmission interference – Cell splitting .

UNIT-III

Wireless LAN technology – IEEE 802.11 wireless LAN standard - Bluetooth Specifications. Bluetooth Architectures. Bluetooth Protocols. Bluetooth Service Discovery. Bluetooth MAC. Bluetooth Packet Structure. Bluetooth Audio. Bluetooth Addressing. Bluetooth Limitations. Bluetooth Implementation. Conclusions.

UNIT-IV

The WAP Forum. The WAP Service Model. The WAP Protocol Architecture. The WWW Programming Model. The WAP Programming Model. Cordless systems- Mobile IP.

UNIT-V

Ad-hoc wireless networks - Types – ad-hoc media access protocols – MARCH – Routing protocols – Table-Driven Approaches. Destination Sequenced Distance Vector (DSDV). Wireless Routing Protocol (WRP). Cluster Switch Gateway Routing (CSGR). Source-Initiated On-Demand Approaches. Ad Hoc On-Demand Distance Vector Routing (AODV). Dynamic Source Routing (DSR). Temporally Ordered Routing Algorithm (TORA). Signal Stability Routing (SSR). Location-Aided Routing (LAR). Power-Aware Routing (PAR). Zone Routing Protocol (ZRP). Source Tree Adaptive Routing (STAR). Relative Distance Microdiversity Routing (RDMAR).

REFERENCE BOOKS :

1. Jochen Schiller, *Mobile Communications*, 2nd Edition, Addison-Wesley, 2001.
2. C. K. Toh, *AdHoc Mobile Wireless Networks: Protocols and Systems*, Addition Wesley, 2001.
3. William Stallings, *Wireless communications and Networks*, 2nd Edition, Pearson Education Asia, 2000.
4. Asoke K Talukder and Roopa R Yavagal, *Mobile ComputingTechnology, Applications and Service crestion*, Tata McGraw Hill, 2005.

CS931 MULTIMEDIA SYSTEMS

UNIT – I

Introduction – Taxonomy – Multimedia Objects – Applications – CDs – DVDs – Texts – capture – compression-Digital Imaging Technology.

UNIT – II

Image – Application – Capture – Compression – Types of Compression – Image Compression – CCITT- JPEG – Standards– File Formats-Images on the Web.

UNIT – III

Audio – Application – Capture – Compression – Standards – MIDI – File Formats – Speech Recognition and Synthesis-Digital Audio.

UNIT – IV

Video – Applications – Capture – Video Image Compression –Standards – H261 – H263 – MPEG – -DVI Technology -File Formats – Animations.

UNIT – V

Multimedia Databases – Multimedia Operating Systems – Networking and Streaming – Authoring – Virtual Reality-The Creative Process.

REFERENCE BOOKS :

1. Koegel Buford JFK, "Multimedia Systems", Addison Wesley Longman, 2001.
2. Mark JB, Sandra K.M., "Multimedia Applications Development Using DVI Technology", McGraw Hill, 1999
3. Borko Furht, "Handbook of Multimedia Computing", CRC Press,2001.
4. Judith Jeffcoate, "Multimedia in Practice – Technology and Applications", Prentice Hall of India, 2001.
5. John Villamil-Casanova, Leony Fernandez- Elias, "Multimedia Graphics", Prentice Hall, 2000.
6. Simon J. Gibbs, Dionysios C Tschritziz, "Multimedia Programming", Addison Wesley, 1995.
7. John F.Koegel Buford, "Multimedia Systems", Addison Wesley, 1994.
8. John Vince, "Virtual Reality Systems", Addison Wesely, 1995.
9. Andleigh PK and Thakrar K, "Multimedia Systems Design", Prentice Hall 1996

CS932 NETWORK PROTOCOLS

UNIT - I

Inter Networking Concepts - Application level - Network level Interconnection – Internet Architecture – Interconnection through IP Routers, Internet Protocol (IP) – Connectionless Datagram Delivery, routing IP datagrams, errors and control messages (ICMP). Subnet and Supernet Address extensions – User datagram protocol (UDP).

UNIT- II

Routing Cores - peers – Algorithms – Autonomous Systems – Exterior Gateway Protocol Multicast Address. Internet Group Management Protocol (IGMP) and Implementation. TCP/IP over ATM networks: ATM cell Transport , Adaptation Layer, IP Address Building in an ATM network – Logical IP subnet Concept – ATM-ARP packet format. Socket Interface: UNIX I/O – Paradigm and Networks I/O Creating a socket – Inheritance and Termination connecting socket to destination addresses – obtaining information about hosts, networks, protocols, network services. Bootstrap and auto configuration – Domain name system.

UNIT - III

IPX/SPX Programming – Invoking IPX – Event control block – IPX packet header, IPX commands – Event Service Routines – Receiving and Sending IPX messages – SPX header – SPX command – Receiving and sending SPX messages.

UNIT - IV

Multimedia Networking – Streaming Stored Audio and Video – Real Time Streaming Protocol (RTSP) – RTP basis – RTP packet header fields – RTP Control Protocol – RSVP – essence of RSVP – path messages – Transport of reservation messages – IP Telephony Protocol – Voice and Video over IP with RTP and RTCP. Session Initialization Protocol (SIP) – SIP messages – Advanced Services with SIP – SIP Security – Media Gateway to Media Controller Protocol (MGCP) – Multicast Routing Protocol.

UNIT - V

Remote Login (Telnet, Rlogin) – File Transfer and Access (FTP, TFTP, NFS), Electronic mail (SMTP, MIME) – Internet Management (SNMP, SNMPV2) – Internet Security and Firewall Design – Post Office Protocol (POP) – Network News Transfer Protocol (NNTP).

REFERENCE BOOKS:

1. Barry Nance, Network Programming In C , Prentice Hall, 2001.
2. Douglas E. Comer, Internetworking with TCP/IP, Prentice Hall, 1998.
3. James K. kurose and Keith W.Ross, Computer Network – A Top Down Approach Featuring the Internet, Pearson Education Inc., 2001.
4. Oliver Hersent, David Gurle, and lean Pierre Petit, IP Telephony – Packet Based Multimedia Communication System, Pearson Education Inc., 2001.
5. E.D. Tylore, Networking Handbook, Tata McGraw Hill, 2000.

CS933 OPTICAL COMMUNICATION NETWORKS

UNIT- I

Introduction to optical networks – Principles of optical transmission – Evolution of optical networks – Components and enabling technologies – Wavelength division multiplexing (WDM) – WDM network architectures, broadcast-and-select networks, linear lightwave networks, and wavelength routed networks – Issues in broadcast-and-select networks.

UNIT- II

Static traffic routing in wavelength routed networks – Virtual topology design – problem formulation and algorithms - design of multi-fiber networks – Virtual topology reconfiguration – problem formulation - reconfiguration due to traffic changes - reconfiguration for fault restoration – Network provisioning.

UNIT- III

Dynamic traffic routing in wavelength routed networks – Routing and wavelength assignment algorithms – Centralized and distributed control – Introduction to Wavelength convertible networks – Wavelength rerouting.

UNIT- IV

Control and Management – Functions – Framework – Information Model – Protocols – Optical layer Services and Interfacing – Network Survivability – Protection in SONET / SDH – Protection in IP Networks – Optical Layer Protection – Schemes.

UNIT- V

Next generation optical Internets – burst switching – packet switching (IP-over-WDM) – Multicast traffic routing – source rooted trees - Access Networks – PON, FTTC, FTTH.

REFERENCE BOOKS :

1. B. Mukherjee, *Optical Communication Networks*, McGrawHill, 1997 (UNIT I)
2. Rajiv Ramaswami and Kumar N. Sivarajan, *Optical Networks: A Practical Perspective*, 2nd Edition, Morgan Kaufmann (Elsevier Indian Edition), 2004. (Units IV and V).
3. C. Siva Ram Murthy and Mohan Gurusamy, *WDM Optical Networks: Concepts, Design, and Algorithms*, PHI, 2002. (Units I, II, III, and V)

CS934 REAL-TIME COMPUTING AND COMMUNICATIONS

UNIT-I

Introduction to Real-Time system – Characteristics – Types of Real-Time tasks – Timing constraints –Real-Time Scheduling:- Basic concepts and classification of Algorithms – Clock-Driven Scheduling – Event-Driven Scheduling – Hybrid schedulers – EDF Scheduling – RM Scheduling and its Issues.

UNIT-II

Resource Sharing and Dependencies among Real-Time tasks:- Resource sharing in Real Time tasks, Priority Inversion, Priority Inheritance Protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling Task dependencies – Scheduling Real-Time Tasks in Multiprocessor and Distributed Systems – Resource Reclaiming in Multiprocessor Real-Time Systems – Fault-Tolerant Task Scheduling in Multiprocessor Real-Time Systems.

UNIT-III

Real-Time Operating System (RTOS):- Features of RTOS, Commercial Real-Time Operating Systems, Real-Time Databases:- Applications, Design issues, Characteristics of Temporal Data, Concurrency control, Commercial Real-Time Databases.

UNIT-IV

Real-Time Communication in Wide Area Networks:- Introduction, Service and Traffic Models and Performance Requirements, Resource Management, Switching Subsystem, Route Selection in Real-Time Wide Area Networks:- Basic Routing Algorithms, Routing during Real-Time Channel Establishment, Route Selection Approaches, Dependable Real-Time Channels

UNIT-V

Real-Time Communication in a LAN – Soft Real-Time Communication in a LAN – Hard Real-Time Communication in a LAN – Bounded Access Protocols for LANs – Real-Time Communications over Packet Switched Networks – QoS requirements – Routing and Multicasting.

REFERENCE BOOKS:

1. Rajib Mall, Real-Time Systems Theory and Practice, Pearson Education, India, 2007
2. C. Siva Ram Murthy and G. Manimaran, Resource Management in Real-Time Systems and Networks, Prentice-Hall of India, 2005
3. Jane W.S. Liu, Real-Time Systems, Prentice Hall, USA, 2000

CS935 SOFTWARE METRICS

UNIT I

MESUREMENTS THEORY: Fundamentals of measurement - Measurements in Software Engineering - Scope of Software Metrics - measurements theory - Goal based framework - Software Measurements Validation.

UNIT II

PRODUCTS AND QUALITY METRICS : Measurements of internal product attributes - size and structure. Software quality metrics - Product quality – Process quality - metrics for software maintenance - Case studies of Metrics program - Motorola - HP and IBM. Quality management models - Rayleigh Model - Problem Tracking Report (PTR) model.

UNIT III

OO METRICS: Object-Oriented product metrics – inter module metrics -module metrics for semantic complexity - module metrics for procedural complexity - recommended metrics suites - industrial application of a metrics program - industrial data - introducing a measurement program.

UNIT IV

EMPIRICAL STUDIES OF QUALITY MODELS FOR OO SYSTEMS: Existing studies- dependent variables - independent variables - hypotheses - Data analysis methodology - model construction - model evaluation - future research directions.

UNIT V

Software metrics for distributed software - software dependability: model based approach - Evaluating software complexity measures.

REFERENCES

1. Fenton.N.E and Pfleeger.S.L, Software Metrics - a rigorous and practical approach, International Thompson Computer Press, 1996, 2nd Edition. (UNIT I & II)
2. Kan. S.H, Metrics and models in software quality engineering, Pearson Education Asia, 2002. (UNIT II)
3. Henderson-sellers.B, Object-Oriented metrics - Measures of complexity, Prentice Hall Object-Oriented Series, International Edition 1996. (UNIT III)
4. Briand.L and Wust.J, Empirical studies of quality models in OO systems, Advances in computers, Academic press, vol 56, pp 1-44, 2002. (UNIT IV)
5. Briand.L, Wust.J, Daly.J and Victor Poter, Exploring the relationships between design measures and software quality in OO systems, Journal of systems and software, vol 51, pp 245-273, 200. (UNIT IV)
6. Weyukar.E.J, Evaluating software complexity measures, IEEE Transactions on Software Engineering, vol 14(9), pp 1357-1365, 1988. (UNIT V)
7. Rodrigues.G.N, David Rosenblum and Wolfgang Emmerich, A Model driven approach for software systems reliability, Proceedings of 26th International Conference on Software Engineering, 2004, ICSE'04-(UNIT V)
8. Woei- Jiunn Tsaur and Shi- Jinn Horng, Toward Software Metrics for Distributed Software, Proceedings of Asia Pacific software engineering conference, pp 209- 216, 1995
.(UNIT V)

9.Scott A.Whitemire, Object Oriented Design Measurement, John Wiley & Sons Inc., 1997.

CS936 SOFTWARE RE-ENGINEERING

UNIT - I

Organizing reuse – introduction – motivation for reuse - Reuse driven organizations – managing a reuse project – the characteristics of reuse projects – roles in reuse projects adopting a project to reuse – reuse tools.

UNIT - II

Managing a repository – the REBOOT component model – classification – configuration management of the repository – managing the repository – computer supported co-operations working – process metrics for reuse – produce metrics – cost estimation – Forming a reuse strategy – Assessing reuse maturity.

UNIT - III

Practicing reuse – Generic reuse development process – Develop FOR reuse – Develop WITH Reuse – Resting reusable components – OO components – Techniques and life cycles – OO development for reuse – Architectural design for reuse – detailed design for reuse – Implementation for reuse – Verification test and Validation.

UNIT - IV

Development with reuse – with reuse specific activities – common reuse processes – Phases of development with reuse – Impact of reuse on development cycle.

UNIT - V

Re-engineering for reuse – Methodology – retrieving objects in non object oriented code – Measurements – tool support for re-engineering – overview of clean room software engineering – phases clean room method box structures algorithm – adapting the box structures.

REFERENCE BOOKS :

1. Even – Andre, Karlsson, Software Reuse – A holistic Approach – John Wiley and Sons – 1996.
2. Stacy J.Powell, Carmen J.Trammell et al, "Clean room Software Engineering – Technology and Process", SEI Series in Software engineering Addison Wesley, 1998.
3. Jag Sodhi, Prince Sodhi, " Software Reuse – Domain Analysis and design Process, Mac Graw Hill 1999.

CS937 WEB TECHNOLOGY AND INTERNET PROGRAMMING

UNIT - I

Networks, protocols, Tcp/Ip protocol suites, brief history of Internet, Internet Addresses, ports, sockets, Name Resolution, firewalls, protocol tunneling, proxy servers and Internet standards. WEB BASICS - history of web, inside URL's, web browsers, web servers, resources of Internet, H/W and S/W requirement of Internet.

UNIT - II

HTML - Anatomy of HTML document, Text basics, rules, Images and multimedia, document layout, links and webs, formatted lists, cascading style sheets, forms, tables, frames and executable content. DHTML - Adding Animation, Multiplying the media, Adding Interactivity (dragging and dropping), working with data and dialog boxes, working with text, understanding browser object models, working with vbscript and java script, embedding activex controls in web document.

UNIT - III

CGI - Basics, foundations of CGI, CGI building blocks, building CGI applications, Creating dynamic graphics, web publishing with CGI, database Integration and security.

Perl - Introduction, Perl data structures, control structures, pattern matching and regular expressions, I/P and O/P in perl, report formatting in perl, perl built-in functions, custom functions, references and anonymous data structures, object oriented programming in perl, advanced data manipulation, database programming with perl, perl-CGI programming, web programming with perl script.

UNIT - IV

SERVELETS - Retrieving information, sending HTML information, sending multimedia content, session tracking, security, database connectivity, Applet-servelet communication, Interservelet communication - ASP - Basics-Variables, ASP control structures, objects-properties, methods and events-Request and response objects, Application, session, cookies and error handling objects. Scripting objects, ASP components, Data store Access , using Record sets and building Script components for ASP.

UNIT - V

XML - Anatomy of an XML document, markup elements and attributes, creating valid documents, developing advanced DTD's, XML objects, checking validity, creating XML links, advanced addressing, viewing XML in browsers, processing, event-driven programming, programming with DOM, metadata, styling XML with CSS.

REFERENCE BOOKS:

1. Chris ullman, Beginning ASP3.0 –Wrox press Ltd, 2001.
2. Chuckmusiano and Bill Kennedy, HTML The Definite guide-O'Reilly publications., 2000.
3. Jason Hunter with William Crawford,Java servelet programming - O'Reilly publications, 1998.
4. Joseph schmuller ,Dynamic HTML- BPB publications, 2000.
5. Micheal mcmillian, Perl from the ground up - Tata McGraw-Hill Edition, 1999.

CS 929 EVOLUTIONARY ALGORITHMS

Unit I

Introduction to evolutionary computing – Genetic algorithm (GA) : steps in GA, Genome (individual) representation, fitness, selection methods. Operators in GA, GA parameters.

Unit II

Case study on GA applications (Traveling salesman problem, Time tabling problem, Job scheduling problem)

Unit III

Genetic programming (GP): Steps in GP, individual representation, initial population, tree creation methods, fitness assessment, individual selection methods, GP operators, GP parameters.

Unit IV

Introduction to parallel genetic programming, Distributed genetic programming.

Unit V

Case study on GP applications (symbolic regression, multiplexer, artificial ant)

Text Books:

1. David E.Goldberg, "Genetic algorithm in search, optimization and machine learning", MIT Press.
2. Wolfgangbanzhaf, et al, "Genetic programming : An introduction: On the automatic evolution of computer programs and its applications", MIT press.
3. John koza, "Genetic programming: On the programming of computers by means of natural section, MIT press, 1992.

CS927 DATA MINING AND DATA WARE HOUSING

UNIT-I

INTRODUCTION: Relation to statistics, databases, machine learning - Taxonomy of data mining tasks - Steps in data mining process - Overview of data mining techniques.

UNIT-II

VISUALIZATION AND STATISTICAL PERSPECTIVES: Visualization - Dimension reduction techniques - Data summarization methods - Statistical Perspective - Probabilistic - Deterministic models - Clustering - Regression analysis - Time series analysis - Bayesian learning

UNIT-III

PREDICTIVE MODELING: Predictive Modelling - Classification - Decision trees - Patterns - Association rules - Algorithms.

UNIT IV

DATA WAREHOUSING: Design - Dimensional Modeling - Meta data - Performance issues and indexing -VLDB issues - Development life cycle - Merits.

UNIT V

APPLICATIONS : Tools - Applications - Case Studies

References:

1. Usama M.Fayyad, Geogory Piatetsky - Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances in Knowledge Discovery and Data Mining", The M.I.T Press, 1996.
2. Jiawei Han, Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kauffmann Publishers,2000.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing in Action", John Wiley & Sons Inc., 1997.