

Department of Computer Science
M.Sc Computer Science
Revised Syllabus from the academic year 2006 onwards

OBJECTIVES

The main objective of the M.Sc. Computer Science course is to provide the students a clear understanding of the basic concepts and principles of Computer Science as a discipline and the rich and specialized skill sets required to handle the computing systems in an applied branch of knowledge that represent a realistic world. All aspects of knowledge acquisition, storage, processing, presentation and transition will be covered in the course.

Provision for advanced knowledge in computer science, exposure to the practical and theoretical concepts of computing, current and emerging trends in technology in the context of networking environment are the major attractions of the programme.

On completion of the course, the successful students will be awarded a Master of Computer Science with concentration either in Computer Networks or in Artificial Intelligence.

The M.Sc. Computer Science programme was introduced in 1989 in the University of Kerala. More than one and half decades of experience has gone into the design of the revised scheme & syllabus.

Scheme

I Semester			
Course No	Subject	Credits	Total Credits
COS511	Computer Organization & Architecture	3	20*(19+)
COS512	Data Structures and C++	3	
COS513	Mathematical Foundations of Computer Science	3	
COS514	Information Systems & DBMS	3	
COS515	Design and Analysis of Algorithms	2	
	Elective I		
COS516	Lab I (based on Data Structures and Graphics using C++ and Design and Analysis of Algorithms)	4	
COS517	Case Study I	1	

II Semester			
Course No	Subject	Credits	Total Credits
COS521	Operating Systems	3	20*(19+)
COS522	Computer Networks	3	
COS523	Computer Based Optimization Techniques	3	
COS524	System Software and Compiler Design	3	
COS525	Software Engineering-an OO approach	2	
	Elective II		
COS526	Lab II (based on Computer Based Optimization Techniques and Compiler Design) & Viva-Voce	4	
COS527	Case Study II	1	

III Semester (STREAM I)			
Course No	Subject	Credits	Total Credits
COS531	Network Programming in Java	4	20*(13+)
COS532A	Network Administration & Management	3	
	Elective		
	Elective		
	Elective		
COS533A	Lab III (based on Network Programming in Java)	4	
COS534	Seminar	1	
COS535A	Case Study III	1	

III Semester (STREAM II)			
Course No	Subject	Credits	Total Credits
COS531	Network Programming in Java	4	20*(13+)
COS532B	Software Agents	3	
	Elective		
	Elective		
	Elective		
COS533B	Lab III (based on Pattern Recognition & Neural Networks)	4	
COS534	Seminar	1	
COS535B	Case Study III	1	

IV Semester			
Course No	Subject	Credits	Total Credits
COS541	Project & Viva-Voce	12	12

*Minimum 20 Credits for the first three Semesters each.

List of electives

Semester I		
Course No	Subject	Credits
COS501	Computer Graphics and Multimedia	3
COS502	Modeling and Simulation	2
Semester II		
COS503	Artificial Intelligence	2
COS504	Micro Processors and Interfacing	2
COS505	WAP and WML	2
Semester III		
Stream I		
COS506	Distributed Computing	3
COS507	Wireless Networks	3
COS508	Client Server Computing	2
COS509	Cryptography And Network Security	2
Stream II		
COS5010	Data Mining	2
COS5011	Pattern Recognition	2
COS5012	Machine Learning	3
COS5013	Computational Techniques In Bioscience	2
COS5014	Neural Computing	2
COS5015	Data Compression	2
Common for both Streams		
COS5016	Digital Image Processing	2
COS5017	Systems and Computational Modeling	2
COS5018	Matlab	2
COS5019	Visual Programming	2
COS5020	Software Project Management	3

Students admitted to this programme can take any one of the following streams to complete the M.Sc. programme.

Semester I & II will be common to both Stream I & Stream II. In Semester III, Stream I students will be offered Computer Networks topics and Stream II students will be offered topics in Artificial Intelligence. Semester IV will be focusing on project work.

Those who complete through Stream I will be offered the M.Sc. Computer Science Degree with concentration on Computer Networks and Stream II will be offered the M.Sc. Computer Science Degree with concentration on Artificial Intelligence.

Eligibility

Candidates shall be required to possess First class Bachelor's Degree in Computer Science/ Computer Applications/Electronics with not less than 60% marks or an equivalent degree recognized by the University of Kerala.

Admission: As per C.S.S regulations

Duration: 4 semesters: 3 semesters of taught courses and one semester of project work.

Examinations: As per C.S.S regulations

Sessional Marks:

The sessional marks are awarded in each paper will be based on 2 class tests and assignments/ lab reports for theory/ practical and attendance. Split up is shown below:

Theory

Internal Examination (CA) - 40 marks

The split-up for internal mark is given below:

Attendance - 5 marks

Class Test (minimum 2) - 15 marks

Assignment (minimum 2) - 10 marks

Test/Seminar/Practical Test/Records/Viva - 10 marks

End Semester Examination(ESA) - 60 marks

For seminars, the sessional marks will be based on presentation/seminar report and participation.

Practical:

Lab Exam - 80 %

Viva-Voce - 20 %

Case Study:

Content - 20%

Software & Methodology - 40%

Presentation - 25%

Viva-Voce - 15%

Project:

Content - 20%

Software & Methodology - 40%

Presentation - 25%

Viva-Voce - 15%

The students are required to present the progress of their project works at least twice to the concerned Faculty members.

Programming platforms: Unix/Linux, Windows

Special Software Skills: Other skill sets required to complete the programme will be announced by the Department at the beginning of the semester.

Detailed Syllabus

Core Subjects

First Semester

COS511 COMPUTER ORGANIZATION AND ARCHITECTURE

Module I: Introduction, Computer Evolution and Performance, System Buses : Computer Components, Computer Function, Interconnection Structures, Bus Interconnection, PCI. Internal Memory : Computer Memory system, Semi Conductor Main Memory, Cache Memory, Advanced DRAM Organization. External Memory : Magnetic Disk, RAID, Optical Memory, Magnetic Tapes. Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupted –Driven I/O, DMA, I/O Channels and Processors, External Interface.

Module II: Computer Arithmetic: ALU, Integer Representation, Integer Arithmetic, Floating - Point Representation, Floating - Point Arithmetic. Instruction Sets: Characteristics and Functions: Machine Instruction Characteristics, Types of Operands, Types of Operations, Assembly Language. Instruction Sets: Addressing modes and Formats: Addressing, Instruction Formats. CPU Structure and Function: Processor Organization, Register Organization, Instruction Cycle, Instruction Pipelining, The Pentium Processor, The PowerPC Processor.

Module III: Reduced Instruction Sets Computers: Instruction Execution Characteristics - Reduced Instruction Set Architecture, RISC Pipelining, The RISC versus CISC Controversy. Instruction –Level Parallelism and Superscalar Processors: Design Issues, Pentium IV, PowerPC, Parallel Processing, Multiple Processor Organizations, Clusters, Vector Computation, Parallel Processors. Control Unit Operations: Micro Operations, Control of the Processor, Hardwired Implementation, Micro-programmed Control: Microinstruction sequencing, Microinstruction Execution- Applications of Microprogramming.

Reference:

- Stallings, William, Computer organization and architecture. 5 ed.- PHI,1996..
- Hamachar, Carl V; Vrasenic, Zvonko G; Zaky, Safwat G, Computer organization .4 ed.- MCH,1996.
- Mano, Morris M, Computer system architecture.-PHI,1991

COS512 DATA STRUCTURES AND C++

Module I: Introduction to Object Oriented programming, Syntax and semantics of C++, Object Oriented programming in C++-classes, objects, polymorphism, binding, inheritance, generalized classes and other general concepts in OOP.

Module II: Object Oriented Models-Introduction to UML, Finding the objects and responsibilities, Specifying Static and Dynamic Behavior of model, Identifying relationships, Design the models.

Module III: Data structures-Concepts, Memory allocation strategies. Linear Data Structure: Arrays, Linked lists, stack, queue and their applications. Nonlinear Data Structures: Trees,- binary tree, AVL trees, Red-Black trees; Graphs and its representations. File structure and Sorting: File representations techniques, File organization, searching techniques.

Reference:

- Lee, Richard C; Tepfenhart, William M, UML and C++: a practical guide to object- oriented development. 2 ed.-PHI,2001.
- Lippman, stanley, B, C++ primer .3 ed.-Pearson Education Asia,2000

- Horwitz ,E and Sahni, Sartaj, Fundamentals of Data structures.- Galgotia,
- Cormen, Thomas H; Leiserson, Charles E and Rivest, Ronald L,
- Introduction To Algorithms. 2ed.-New Delhi, Prentice Hall,1990

COS513 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Module I: Mathematical Logic-Statements and notations, Connectives, Well-Formed Formulas, Tautologies, Implications, Normal Forms, Statement Calculus and Predicate Calculus; Review of Set Theory and Vector Space

Module II: Algebraic structures:-Semigroups and Monoids, Homomorphism , Isomorphism, Groups, Subgroups, Symmetric Groups,Dihedral groups,Cyclic groups, Direct product,Generators and Evaluation of Powers, Co-sets and Lagrange's Theorem, Normal Subgroups,Permutation of Groups and Burnside's Theorem, Codes and Group Codes, Algebraic Systems with two binary operations.Lattices and Boolean Algebra:- Lattices, Sublattices, Direct product, Homomorphism, Special lattices, Boolean algebra, Boolean functions, Minimization of Boolean Functions. Graphs-Basic Terminology, Multigraphs and Weighted Graphs, Paths and Circuits, Hamiltonian Paths and Circuits, Planar Graphs and Euler's formula, Trees, Rooted tree, Prefix codes, Binary Search Trees, Spanning Trees and Cutsets, Transport Networks.

Module III: Introduction to formal languages, Basic concepts of automata theory,Finite automata: Deterministic finite automata,Non- Deterministic finite automata, Application-Text Search, Regular expression,Algebraic laws for regular expressions,Properties of regular languages, Basic concepts of context-free languages and turing machine.

References:

- Tremblay, J P; Manohar, R, Discrete mathematical structures with applications to computer science. - TMH, 1975.
- Liu, C L, elements of discrete mathematics. 2 ed.-MCH,1986.
- McEliece, Robert J; Ash, Robert B; Ash, Carol, Introduction to discrete mathematics. - MCH, 1989.
- John.E.Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia, 2002.
- Deo, Narsingh, Graph theory with applications to engineering and computer science. - PHI

COS514 INFORMATION SYSTEMS AND DBMS

Module I: Organizations, Management and the Networked Enterprise: Managing the Digital Firm, Information Systems in the Enterprise, Information Systems, Organizations, Management and Strategy, The Digital Firm: Electronic Commerce and Electronic Business. Information Technology Infrastructure: Managing Hardware Assets, Managing Software Assets, Managing Data Resources, Telecommunications and Networks, The Internet and the New Information Technology Infrastructure.

Module II: Introduction to Databases, Database Environment, The Relational Model and Languages: The Relational Model, Relational Algebra and Relational Calculus, SQL, QBE, Database Design: Entity Relationship Modeling, Normalization, Security, Transaction Management: Transaction Support, Concurrency Control, Database Recovery.

Module III: Introduction to Object DBMSs: Advanced Database Applications, Weaknesses of RDBMSs, Object-Oriented Concepts, Storing Objects in a Relational Database, Next-Generation Database Systems, Object-Oriented DBMSs-Concepts and Design: Introduction to Object-Oriented Data Models and DBMSs, OODBMS Perspectives, Persistence, Issues in OODBMSs, Advantages and Disadvantages of OODBMSs Object-Oriented Database Design.

References:

- Connolly, Thomas M; Begg, Carolyn E, Database systems: a practical approach to Design,Implementation, and Management.3 ed. - Pearson Education Asia, 2003.

- Laudon, Kenneth C ; Loudon, Jane P, Management Information Systems : managing the digital firm. 7ed. - Pearson Education Asia, 2002.

COS515 DESIGN AND ANALYSIS OF ALGORITHMS

Module I: Review of basic data structures. Design of Efficient Algorithms -algorithms, Analysis of Algorithms, Time and Space complexity, Asymptotic Notations, Solving Recurrence Relations, Recursive Algorithms, Analysis of recursive algorithms.

Module II: Divide and conquer-General methods, binary search, Min Max, merge sort, quick sort, matrix multiplication and related operations; Greedy Method-Elements of greedy strategy, 0-1-knapsack problem, Huffman's algorithms, Dynamic Programming, Graph Algorithms – Breadth First Search, Depth First Search , Minimum Spanning Trees, Single Source Shortest Path, All pairs Shortest Path, Polynomial Problem, NP-hard and NP-complete problems.

References:

- Cormen, Thomas H; Leiserson, Charles E; Rivest, Ronald L, Introduction To Algorithms. - Prentice Hall of India, 1990.
- Weiss, Data Structures and Algorithm Analysis in C++ 2/e
- Levitin, Introduction to the Design and Analysis of Algorithms 1/e
- Horowitz, Ellis; Sahni, Sartaj; Rajasekara, Sangathevar, Computer algorithms. - Galgotia, 1998

Second Semester

COS521 OPERATING SYSTEMS

Module I: Introduction, Mainframe Systems, Desktop Systems, Multiprocessor Systems Distributed Systems, Clustered Systems, Real-Time Systems, Handheld Systems. Computer - System Structure: Computer-System Operation, I/O Structure, Storage Hierarchy, Hardware Protection, Network Structure. Operating - System Structures: System Components, Operating System Services, System Calls, System Programs, System Structure and Virtual Machines. Process Management: Processes: Process Concept, Process Scheduling, Operating on Processes, Cooperating Process, Inter-process Communication. Threads: Multithreading Models, Threading Issues, Pthreads. CPU Scheduling: Scheduling Criteria and Scheduling Algorithms, Multiple-Processor Scheduling, Real Time Scheduling - Algorithms Evaluation. Process Synchronization: Critical Section Problem, Semaphores & Monitors. Deadlock: Deadlock-Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection and Recovery.

Module II: Storage Management: Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation and Segmentation with Paging. Virtual Memory: Demand Paging, Page Replacement, Allocation of frames, Thrashing. File System Interface: Access Methods, Directory Structure, File Sharing, Protection. File System Implementation: File System Structure, Allocation Methods, Free-Space Management. I/O Systems: I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware Operations. Mass-Storage Structure: Disks Structure, Disk Scheduling and Management, Swap-Space Management - RAID Structure.

Module III: Distributed Systems: Distributed Systems Structures- Topology, Network Types, Communication, Communication Protocols, Robustness. Distributed File Systems: Naming and Transparency, Remote File access, File Replication. Distributed Coordination: Event Ordering, Mutual Exclusion, Atomicity, Concurrency Control, Deadlock Handling Election Algorithm, Reaching Agreement. Protection: Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Language-Based Protection. Security: Security Problem, User Authentication, Program Threats, System Threats, Encryption and Computer Security. Case Studies: Linux System, Windows 2000, Windows XP.

Reference:

- Siberschatz, Abraham; Galvin, Peter Baer and Gangne, Greg, Operating system concepts: windows XP update .6ed. - John Wiley & Sons, 2003.
- Stallings, William, Operating systems .2 ed. - PHI, 1995.
- Tanenbaum, Andrew S, Modern Operating Systems. 2ed. - PHI, 2002.
- Nutt, Gary J, Operating systems: a modern perspective. 2ed. - Pearson Education Asia, 2002.

COS522 COMPUTER NETWORKS

Module I: Computer Networks and the Internet; The Network Edge; The Network Core; Network Access and Physical Media ; ISPs and Internet Backbones; Delay and Loss in Packet-Switched Networks; Protocol Layers and Their Service Models; Application Layer. Principles of Application Layer Protocols; The Web and HTTP; File Transfer:FTP; Electronic Mail in the Internet; DNS-The Internet's Directory Service; Socket Programming with TCP; Building a Simple Web Server; Content Distribution.

Module II: Transport Layer- Introduction and Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control, Networking Layer & Routing- Introduction and Network Service Model, Routing Principles, Hierarchical Routing, The Internet Protocol, Routing and the Internet, What's Inside a Router, IPv6, Multicast Routing, Mobility and the Network Layer.

Module III: Link Layer- Data Link Layer: Introduction and Services, Error Detection and Correction Techniques, Multiple Access Protocols, LAN Addresses and ARP, Ethernet. Hubs, Bridges and Switches, Wireless Links, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode (ATM), Frame Relay, Wireless & Mobility- Introduction to Wireless and Mobility. Wi-fi, Mobility Principles, Cellular Telephony, Mobile IP, Ad hoc Networks, Moving Beyond the Link Layer-An Interlude, Network Security.

Reference:

- Kurose, James F ; Ross, Keith W , Computer networking: a top-down approach featuring the internet. - Addison-Wesley, 2001.
- Comer, Computer Networks and Internets with Internet Applications 4/e
- Andrew S. Tanenbaum, Computer Networks, 4/E, Pearson
- William Stallings, Data and Computer Communications, Seventh Edition, Pearson

COS523 COMPUTER BASED OPTIMIZATION TECHNIQUES

Module I: Probability:-Sample Space, Events, Permutations and Combinations, Probability Axioms, Addition Rule, Conditional Probability, Independence and Multiplication rule Bayes Theorem

Module II: Linear Programming- Formulation of LPP, General mathematical model of LPP, Slack and Surplus variables, Canonical and standard form of LPP, Graphical method; standard LPP and Basic solution. Fundamental theorem of LPP, Simplex Algorithm, Big-M method and revised simplex algorithm. Concept of Duality: Formulation of Dual LPP, Duality theorem, advantages of duality, dual simplex algorithm and sensitivity analysis.

Module III: Transportation Problem- Transportation problem, Loops in transportation table, Methods for finding initial basic feasible solution. Tests for optimality, Unbounded transportation problem. Assignment Problem-Mathematical form of the assignment problem, methods of solving assignment problem, Variations of the Assignment problem , Network analysis by Linear Programming, CPM and PERT.

References:

- Taha H., Operations Research. 3ed. -Collin McMillan, 1982
- Hiller, F.S ; Leibermann, G.J., Operations Research.- Holden Day 1974

- Brokes, B C ; Dick, W E L., An Introduction to Statistical Method.-Heinemann Edal Books, 1969

COS524 SYSTEM SOFTWARE AND COMPILER DESIGN

Module I: System software and Machine Architecture, CISC and RISC machines, Assemblers-Basic Assembler Functions, Machine dependent and independent Assembler features, Assembler design options. Loaders and Linkers- Basic loader functions, Relocation, Program linking, Linkage editors, Dynamic linking, Bootstrap loaders, Macro Processors- Macro definition and expansion. Macro processor algorithm, Macro processor Design options

Module II: Compilers- Phases of compiler, Lexical analysis: Specification and recognition of tokens. Finite Automata, regular expression to NFA. Syntax Analysis: Context free grammar, Top-down and Bottom up parsing, operator precedence parsing, LR parsers, and parser generators.

Module III: Intermediate code generation, Code generation-run-time storage management, basic blocks and flow graphs, register allocation and assignment, the DAG representation, Code Optimization- optimization of basic blocks, loops in flow graphs, code improving transformations.

Reference:

- Beck, Leland L, System software: an introduction to system programming. 3ed Addison Wesley, 97.
- Donovan, John J., System Programming. - TMH, 1995.
- Holub, Allen., Compiler design in C. - PHI, 1990.
- Aho, Alfred V; Ullman, Jeffrey D., Principles of compiler design. - Narosa, 1985.

COS525 SOFTWARE ENGINEERING – AN OO APPROACH

Module I: Introduction – Object Orientation – Gathering User Requirements – Validation techniques.

Module II: Object - Oriented Concepts – Object - Oriented Analysis – Object - Oriented Design – Object - Oriented Testing.

Module III: Software Process – The Post-2000 (P2K) Environment – Skills for Specific Positions – Learning Process. Case study based on Rational Ross.

Reference:

- Ambler, Scott W., The Object primer: the application developer's guide to object orientation and UML. 2 rev ed. - Cambridge University Press,
- Jawadekar, Waman S., Software engineering: principles and practice. - TMH, 2004.
- Jacobson, Ivar., Object-oriented software engineering: a use case driven approach. - England, Addison-wesley, 1992.
- Booch, Grady;; Rumbaugh, James; Jacobson, Ivar., The Unified Modeling Language user guide. - Pearson Education Asia, 2002.

COS526 LAB II & VIVA-VOCE

Lab examination will be conducted based on Computer based Optimization Techniques and Compiler Design.. A comprehensive Viva-Voce will also be conducted at the end of second semester based on the subjects they have studied in two semesters. The marks assigned to these are:

Practical	- 50 %
Viva-Voce	- 50 %

Third Semester

COS531 NETWORK PROGRAMMING IN JAVA

Module I : Inter-process communication, UNIX concepts supporting network programming: processes, threads, signals, pipes, Sockets programming; Internet addressing; TCP sockets; UDP sockets; raw sockets.

Module II: Sockets for Clients, Sockets for Servers, UDP Datagrams and Sockets, The URLConnection Class, Protocol Handlers, Content Handlers, Multicast Sockets, Remote Method Invocation, The Java Server API and Servlets

Module III: Web service – Design Issues of Domain Name Servers, browsers, cookies, Scripting languages-HTML, XML, Perl, JavaScript, Java applets, VB scripts

Module IV: Web server-different web servers and their working-IIS, tomcat, apache, etc, server side scripting –servelets, JSP, ASP (.NET), Network programming facilities in Python and C#. Multimedia and Networks

Reference:

- Naughton, Patrick; Schildt, Herbert., Java 2, the complete reference. - New Delhi, TMH, 1999.
- Harold, Java Network Programming, 3/ED Shroff Publishers
- Darnell, Rick Etal., HTML 4. - Techmedia, 1999.
- Ladd, Eric; O'Donnell , Jim., Using HTML 4,XML, and Java 1.2. - PHI, 1999.
- Lerdorf,Rasmus; Tatroe,Kevin., Programming PHP. - Shroff, 2002.
- Orfali, Client/Server Programming with Java and CORBA, Shroff Publishers
- Harold, Elliot Rusty., XML bible. - IDG books, 2000.
- Using Internet Information Server 4, Nelson Howell,et al, Prentice Hall of India 2001
- Guelichz, Scott; Gundavaram; Birznieks, Gunther., CGI programming with Perl.- Beijing,:O'reilly/ Shroff publishers, 2000
- Goodwill, James., Developing java servelets. - Techmedia, 1999.
- Hanna, Phil., JSP: the complete reference. - TMH, 2001.

COS532A NETWORK ADMINISTRATION AND MANAGEMENT

Module I: Global Concepts for Administration and Management & Security and Administration; Hardware, switches routers and gateways; Hardware interfaces: ethernet, ADSL and modems; Networking software - network configuration: TCP/IP, port mapping; Classfull and classless network addressing; System Backup, and Software Installation. system backup and utilities, compiling source code into programs and installing programs using Red Hat Package Manager

Module II: Introduction to Unix and Windows server; DHCP and Bootp servers; Network Information Services - Configuring Network Services and Security. Discussed types of network services, configuring DNS, DHCP, Apache, Samba, NFS, FTP, NIS, and SSH.; Networked file systems: Linux Filesystem Administration. the Filesystem Hierarchy Standard, file and directory management commands, finding files, linking files, file and directory permissions and ownership and special permissions, the /dev directory and device files, filesystem types, mounting, working with floppy disks, working with CD-ROMS, working with hard disks, hard disk partitioning, monitoring disk usage, checking filesystems for errors, and hard disk quotas

Module III: Basic routing mechanisms, routing protocols and strategies; Domain Name Servers; Network monitoring and traffic flows; Securing Your Server and Network.- restricting user access to the network, password properties, and intruder lockout. restricting administrative access to the network, protecting servers and workstations from viruses, common internal security problems, and firewall technologies.

Module IV: Firewall and Gateway configuration - iptables, fwbuilder; Caching servers and proxy servers - squid. Network Performance- Queuing ,Buffering,Error Rates,Retransmission. Fault Discovery, Fault Analysis ,Fault Resolution, Backup/Recovery

Reference:

- Steven Andres, Brian Kenyon, Security Sage's Guide to Hardening the Network Infrastructure, Syngress Publishing
- Bozidar Levi , UNIX Administration: A Comprehensive Sourcebook for Effective Systems & Network Management, CRC press, 2001
- Tony Bautts, Terry Dawson, Gregor N. Purdy, Linux Network Administrator's Guide, O'Reilly, 2005
- Murphy, IP version 6.0 network Administration, Shroff Publishers
- Smith , Linux Network Security, Shroff Publishers
- Andrew S. Tanenbaum, Computer Networks, 4/E, Pearson
- William Stallings, Data and Computer Communications, Seventh Edition, Pearson
- Craig Hunt, Robert Bruce Thompson, Windows NT TCP/IP Network Administration, O'Reilly, 1998
- Scott Mueller, Terry Ogletree, Upgrading and Repairing Networks, 4th Ed, Que.
- Craig Hunt, TCP/IP Network Administration, O'Reilly, 2002
- Neal Allen, Network Maintenance and Troubleshooting Guide, Cisco Press
- John M Lusa, The Network Manager's Handbook, CRC press, Third Edition, 2001
- Thomas R Peltier , Information Security Policies, Procedures, and Standards: Guidelines for Effective Information Security Management, CRC press, 2001
- Randhawa, Tejinder S., Hardy, Stephen, Network Management in Wired and Wireless Networks, Springer

COS532B SOFTWARE AGENTS

Module I: Introduction to Agents. Reactive Machines-stimulus response agents, introduction to neural networks, state machines, robotic vision

Module II: Search in state space: agents that plan, uniformed search, heuristics search, planning, acting, and learning, alternative search formulations and applications, adversarial search

Module III: Planning methods based on logic: the stimulation calculus, planning; Communication and integration-multiple agents, communication among agents, agent architectures.

References:

- Nilsson, Nils J., Artificial intelligence, a new synthesis. - Harcourt(India), 2000
- Wooldridge MR, Intelligent Agents, in G.Weiss(Ed), Multiagent Systems,MIT Press, Cambridge.
- Jeffrey M. Bradshaw, Software Agents (Editor). MIT Press
- Russel, Stuart J and Norvig, Peter.,Artificial intelligence, a modern approach. - Pearson Asia, 1995
- Rich, Elaine; Knight, Kevin., Artificial Intelligence. - Tata McGraw-Hill, 1991.
- Luger., Artificial Intelligence. 4 ed.- Pearson Education.
- Relevant websites on Agent systems

COS534 SEMINAR

In this paper the students have to prepare a well written seminar report on any new techniques/technologies in computer science and related fields. There shall be a presentation on the basis of the report submitted. The distribution of marks is

Contest	:	40%
Presentation	:	40%

Viva (open session) : 20%

Elective Subjects

First Semester

COS501 COMPUTER GRAPHICS AND MULTIMEDIA

Module I: Overview of graphic systems, Display devices, Hard Copy Devices, Interactive Input Devices, Display Processors, Output primitives and its construction algorithms, Two Dimensional Geometric Transformations, Window to Viewport Transformations, Clipping, 3-D Display Techniques, 3-D Object representations, 3-D transformations, Hidden Surface Removal Methods.

Module II. Multimedia: Introduction, Definition, Multimedia System Architecture, Design Objects for Multimedia systems, File Formats for Multimedia Systems, Need for Data Compression, The stages of a Multimedia Project, Multimedia skills and training, The term-multimedia building blocks, Text, The power of meaning, Fonts and faces, Text in Multimedia, Font editing and design tools, Hypermedia and Hypertext.

Module III: Multimedia Building Blocks: Sound, The power of sound, Multimedia system sounds, MIDI versus Digital Audio, Digital audio making, MIDI Audio, Audio File Formats, , Adding sound to your multimedia project, Images, making still images, color image file formats, Animation, The power of Motion, Principles of Animation, Making Animations that work, Video, Using Video, How Video works, Broadcast video standards, Integrating Computers and Television, Shooting and Editing Video, Video tips, Recording formats, Digital Video., Multimedia Authoring Tools.-Flash

References:

- Hearn, Donald; Baker, Pauline, M., Computer graphics: C version .2 ed. - Pearson, 1995.
- Newman, William M; Sproull, Robert F., Principles of interactive computer graphics., MCH, 1979.
- McIntyre, New Masters of Photoshop, Shroff Publishers
- Vaughan, Tay., Multimedia, Making it work .6 ed. - TMH, 2004.
- Andleigh, Prabhat K; Thakrar, Kiran., Multimedia systems design. - PHI, 2002
- Dousqet, Mastering the Art of Production with 3D Studio MAX 4, Shroff Publishers
- Hodges, Mathew E; Sansnet, Russel M., Multimedia Computing., -Addison Wesley, 1990

COS502 SIMULATION AND MODELING

Module I: System Models - Continuous and discrete models - Static and Dynamic Models - Principles used in modeling - system studies - system analysis - design and postulation. System simulation : Techniques of simulation - Monte Carlo Method - Comparison of analysis and simulation - Types of system - Simulation Numerical computation for simulation -Applications of digital analog and hybrid computers in continuous system simulation - Real time simulation.

Module II: Exponential growth models, exponential decay models - Logistic curves - Generation of growth models - system models - system dynamic diagrams - Multisegment models Representation of time - delay - Review of probability concepts - Arrival pattern and service times - poisson arrival patterns - Exponentiations, Erlang and Hyper Exponential Distribution - Mathematical studies of Queuing problems, Discrete system Simulation

References :

- Gordon, Geoffrey., System simulation.2 ed. - New Delhi, PHI, 1999.
- Maryanski F., Digital Computer Simulation , CBS Distributors.
- Banks, Jerry; Carson, John S; Nelson, Barry L, Discrete-event system simulation. 2ed. - PHI, 1999

Second Semester

COS503 ARTIFICIAL INTELLIGENCE

Module I: Overview of AI, Symbolic Logic: Logic, Propositions, Normal Forms in Propositional Logic, Resolution Principle, Predicate Calculus, WFFs, Clausal Forms, Rules of Inference, Resolution, Rule Based Expert Systems, Knowledge Acquisition and Representation: Machine Intelligence, Knowledge Engineering, Procedure for Knowledge Acquisition, Knowledge Representation, Different Representation Schemes, Reasoning and KRR Systems: Reasoning, Knowledge Representation and Reasoning (KRR) System, Knowledge Representation (KR) Languages, Domain Modeling, Semantic Nets (Associative Networks) Reasoning Systems, Frames Based Systems, Hybrid Representation Systems.

Module II: Uncertainty: Introduction, Non-monotonic and Monotonic Reasoning, Confidence Factor, Bayes Theorem, Non-classical logics, Default Logic, Bayesian Networks, Fuzzy Logic, Search Technologies: Problem Representation, Definitions, Representation Schemes, Problem Solving in AI, Blind Search Techniques, Heuristic Search Techniques, Game Searches, Expert Systems: Introduction, Skill versus Knowledge, Basic Characteristics of an Expert System, Knowledge Engineering, Inferencing, Programming Methodology, Expert Systems – Tools, Constraint Programming.

Reference:

- Rajendra Akerkar, Introduction to Artificial Intelligence, PHI, 2005. Reading Material
- Stuart Russel and Peter Norvig., Artificial Intelligence a Modern Approach, 2nd ed., Pearson Education 2002.
- Nilsson, N.J., Artificial Intelligence:A New Synthesis., Morgan Kaufmann , 1998.
- Rich & Knight ., Artificial Intelligence , 2nd ed., McGraw Hill, 1992

COS504 MICRO PROCESSORS AND INTERFACING

Module I: Architecture of 80386 Microprocessors-Functional block diagram, Internal Architecture, Memory Address Space and Data organization, Data Types, Segment Registers and Memory Segmentation, Instruction pointer, General Purpose Registers, Flag Registers, Stack, Generating a real mode memory space and I/O address space, Protected mode Register model, protected mode memory Management and Address Translation. Programming of 80386-Programming model, Instruction Set, Development of Assembly Language Programs, Addressing modes. Memory Interfacing-Interface of 80386, System clock, Bus status, Bus cycle timing, Hardware organization of memory address space, Memory interface circuitary. I/O Interfacing-Types of I/O, I/O bus cycle Timing, Core and Special Purpose I/O interface, I/O circuitary, Keyboard and Display interface, Serial Communication Interface, Programmable Communication Interface Controllers.

Module II: Interrupt and Exception Processing-Types of Interrupts and Exceptions, Interrupt Vector and Interrupt Descriptor Tables, Interrupt Instructions, Software Interrupts, Non-maskable Interrupts, Enabling/Disabling of interrupts, 8259A Programmable Interrupt Controller. Pentium Processor: Internal Architecture, Software Architecture, Hardware Architecture, Signal Interfaces, Memory Subsystem Circuitary, Bus Cycles, Non pipelined, pipelined and Burst Cache memory, Interrupts and internal Exceptions, Pentium processor with MMX Technology.

Reference:

- Triebal, Walter A ; Singh, Avtar., The 8088 and 8086 microprocessors: programming, interfacing, software, hardware, and applications including the 80286, 80386, 80486, and Pentium Processor families. - PHI, 2003.
- Anderson, Don; Shanley, Tom., Pentium Processor System Architecture 2 ed. - California, Addison Wesley, 1995.

- Brey, Barry, B., Intel microprocessors: 8086/8088,80186/80188,80286,80386,80486 Pentium and Pentium processors, architecture, programming and interfacing. - PHI, 1997.

COS505 WAP AND WML

Module I: WAP-Mobile Communication-GSM,SMS; WAP Objectives, WAP Architecture, WAP Layers-Wireless Application Environment and Wireless Telephony Application, Wireless Session Protocol and Wireless Transport Layer Security, Wireless Transport Protocol and Barrier Service.

Module II: WML-Introduction, WML Elements-Data types, operators, flow control, functions, libraries; application with WML, WML Deck, WML as server Script. HTML, XML and WML a comparative study.

Reference:

- Singhal, Sandeep, etal., WAP-the wireless application protocol, writing applications for mobile internet. - Addison Wesley, 2001.
- Lee, Beginning WAP, WML & WML scripts, Shroff Publishers

Third Semester

COS506 DISTRIBUTED COMPUTING

Module I: Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols – Network Case Studies. Process and Distributed Objects – Inter process Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Case Study - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications - Java RMI - Case Study.

Module II: Operating System Issues I - The OS Layer - Protection - Processes and Threads - Communication and Invocation – OS Architecture - Security - Overview of Security Techniques-Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture - Sun Network File System - The Andrew File System. Operating System Issues II - Name Services -Domain Name System - Directory and Discovery Services – Case Studies: Global Name Service and. X.500. Directory Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time and Logical Clocks - Global States - Distributed Debugging Distributed Mutual Exclusion – Elections – Multicast Communication – Consensus Related Problems.

Module III: Distributed Transaction Processing - Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery - Overview of Replication and Distributed Multimedia Systems and Shared Memory.

Reference:

- Coulouris, George; Dollimore, Jean; Kindberg, Tim., Distributed Systems Concepts and Design. 3 ed.- Pearson Education, 2002.
- Mullender, Sape .,Distributed Systems.2 ed.- Addison Wesley, 1993.
- Fleishman, Albert.,Distributes Systems: software design and implementation.-Springer-Verlag, 1994
- Liu, M.L., Distributed Computing Principles and Applications.- Pearson Education, 2004.
- Tanenbaum, Andrew S ; Steen, Maartenvan,. Distibuted Systems:principles and pardigms.-,Pearson Education, 2002

- Singhal, Mukesh; Shivaratri, Niranjana G., Advanced concepts in Operating Systems : distributed, database, and multiprocessor operating systems. - New York, McGraw-Hill, 1994.

COS507 WIRELESS NETWORKS

Module I: Overview of Wireless networks-Characteristics of the Wireless Medium-physical layer alternatives for wireless networks-wireless medium access alternatives. Network planning- Wireless Network Topologies – Cellular Topology - Cell fundamentals - Capacity expansion techniques – Network Planning for CDMA Systems- wireless network operation- Mobility Management – Radio Resources and Power Management – Security in Wireless Networks.

Module II: GSM and TDMA Technology - CDMA technology – Reference Architecture – IS 95 and IMT 2000 - Mobile Data Networks – Data oriented CDPD Network – GPRS and Higher data rates - SMS in GSM – Mobile Application Protocols. Introduction to wireless LAN- IEEE 802.11x, WLAN- wireless ATM and HIPERLAN.

Module III: Ad hoc Networking – routing- static and dynamic-examples – WPAN-Wireless Geo location – Wireless Geo location System Architecture.

Reference:

- Kaveh Pahlavan, Prashant Krishnamurthy., Principles of Wireless Networks.- Pearson Education, 2002.
- Rappaport, Theodore S., Wireless Communications: principles and practice.- Pearson Education, 2002.
- Stallings, William ., Wireless Communications and Networks.- Pearson Education, 2002.
- Mallick, Marty., Mobile and Wireless Design Essentials.- Wiley, 2003.
- Feher, Kamili., Wireless Digital Communications.- Prentice Hall of India, 2002.
- Black, Toy ., Wireless Communication Technology.- Thomson Learning 2001.

COS508 CLIENT SERVER COMPUTING

Module I: Overview of Client/Server Computing, Evolution of Client/Server Computing, Overview of Client/Server Applications, Understanding Client/Server Computing.

Module II: Client Hardware and Software, Client Software products, Client Requirements, Server Hardware, Server Environment, Server Operating Systems, Server Requirements, Server Data Management, Access Tools.

Reference:

- Dewire, Travis Dawna Client/Server computing. - NewDelhi, TMH, 1994.

COS509 CRYPTOGRAPHY AND NETWORK SECURITY

Module I: Symmetric Cipher Models- Substitution techniques- Transposition techniques-Rotormachines-Steganography- DES: Simplified DES- Block Cipher principals- The Data Encryption Std.. The Strength of DES- Differential and linear Cryptanalysis- Block Cipher Design principles- Block Cipher modes of operations- IDEA: Primitive operations- Key expansions- One round, Odd round, Even Round- Inverse keys for decryption. AES: Basic Structure- Primitive operation- Inverse Cipher- Key Expansion, Rounds, Inverse Rounds.

Module II: Public key Cryptography and RSA functions:- Principles of Public key Cryptography Systems- RSA algorithms- Key Management - Diffie-Hellman Key Exchange, Elliptic curve cryptography- Authentication requirements- Authentication functions- Message authentication codes- Hash functions- Security of Hash functions and MACS- Digital signatures- Authentication protocols- Digital signature standards.

References:

- Stallings, William., *Cryptography and network security: principles and practice.* - Pearson Education Asia, 2003..
- Charlie Kaufman, Radia Perlman, Mike Speciner , *Network Security: private communication in a network world* 3 ed.-Pearson Education Asia

COS5010 DATA MINING

Module I: Introduction to Data mining; Data Warehouses; Data preprocessing -cleaning, integration and transformation, data reduction, discretization and concept hierarchy generation; data mining primitives, languages and system architecture

Module II: Concept description-characterization and comparison; mining association rules in large data bases, classification and prediction; cluster analysis; application and trends in Data mining

Reference:

- Han,Jaiwei; Kamber,Micheline.,*Data mining: concepts and techniques.* - Morgan Kaufmann Publishers, 2001
- Yazdani, Sima ; Wong, Shirley., *Data warehousing with oracle: an administrator's hand book.* - New delhi: Addison-wesley, 1999.
- Dunham , *Data Mining : Introductory and Advanced Topics 1/e.*
- Berson, Alex; Smith, Stephen; Thearling, Kart., *Building data mining applications for CRM.* - TMH, 2000.
- Delmater, Rhonda; Hancock, Monte., *Data Mining explained, a manager's guide to customer-centric business intelligence.* - Boston: Digital Press, 2000.

COS5011 PATTERN RECOGNITION

Module I: Introduction-Application of Pattern recognition, statistical decision theory, image processing and analysis. Probability: Introduction, probability of events, Random variables, Joint Distribution and Densities, Moments of Random variables, Estimation of Parameters from samples, minimum Risk estimation. Statistical Decision Making: introduction, Baye's Theorem Multiple Features. Conditional Independent Features, Decisions boundaries, Estimation of Error rates, characteristics centers, estimating the composition of populations.

Module II: Non Parametric Decision making: Introduction, Histograms, Kernel and windows Estimators, Nearest neighbor Classification Techniques, adaptive decision Boundaries, Adaptive Discriminant Functions, Minimum Squared Clustering: Introduction, Hierarchical Clustering, Partial Clustering. Artificial Neural networks: Introduction, Nets without Hidden layers, Nets with Hidden layers, The break, propagation algorithm, hopfield nets, an application-classifying sex from facial images. Processing of wave form and images: introduction, gray level scaling, transformations, equalizations, geometric image scaling and interpolations, logarithmic gray level scaling, the statistical significance of image features.

References:

- Gose, Earl; Johnsonbaugh, Richard; Jost, Steve. *Pattern recognition and image analysis.* PHI, 1997
- Fu.K.S, *Syntactic Methods in Pattern Recognition,*.- Academic Press,1994
- Duda, R O ; Hart, P E., *Pattern Classification and Scene Analysis,*.-John Wiley,1973

COS5012 MACHINE LEARNING

Module I: Introduction-applications; Introduction to probability-random variables; spatial random variables; supervised learning; Bayesian decision theory;

Module II: Parametric methods; multi variant methods; dimensionality reduction; clustering; non parametric methods; decision trees; linear discriminations; multi layer perceptrons;

Module III: Local models; Hidden Markov methods; accessing and comparing classification algorithms; combining multiple learners; reinforcement learning

Reference:

- Alpaydin, Ethem., Introduction to machine learning. - Prentice-Hall of India, 2004.

COS5013 COMPUTATIONAL TECHNIQUES IN BIOSCIENCE

Module I: Molecular biology, gene structure and information content, molecular biology tools, genomic information content, data searches and pair-wise alignments, gaps, scoring matrices, Needleman and Wunsch algorithm, global and local alignments, database searches.

Module II: Patterns of substitution within genes, estimating substitution numbers, molecular locks, molecular phylogenetics, phylogenetic trees, distance matrix methods. Character-based methods of phylogenetics, parsimony, ancestral sequences, searches, consensus trees, tree confidence, genomics, prokaryotic gene structure, gene density, eukariotic genomes, gene expression. Protein and RNA structure prediction

References

- Krane, D E ; Raymer, M L., Fundamental Concepts of Bioinformatics., - Pearson Education, 2003.
- Attwood, T K ; Parry-Smith, D J., Introduction to Bioinformatics.- Pearson Education, 2003.
- Zar, J H., Biostatistical Analysis, 4 ed.- Pearson Education, 1999.
- Brayan Bergeron., Bio Informatics Computing.- Pearson Editions, 2003
- Gardner, Eldon John; Simmons, Michael Snustad, Peter Principles of genetics.- John Wiley & Sons 1991.
- Lesk, Arthur M., Introduction to bioinformatics. - Oxford University Press, 2002.
- Rastogi, S C ; Mendiratta, Namita ; Rastogi, Parag., Bioinformatics: concepts, skills & applications. - CBS Publishers & Distributors, New Delhi, 2003.

COS5014 NEURAL COMPUTING

Module I: Introduction – Brain and Computer – learning in biological systems and machines – the basic neuron – modeling a single neuron – learning in simple neurons – the perception – the perceptron learning rule – proof – limitations of perceptron – the multiplayer perceptron – Back Propagation network – Counter Propagation network.

Module II: Kohonen self Organizing networks – introduction – the Kohonen algorithm – weight training – neighborhoods – reducing the neighborhood – the phonetic typewriter – Hopfield networks – introduction – the Hopfield model – the energy landscape – the Boltzman machine – constraint satisfaction. Adaptive resonance theory – architecture and operation – ART algorithm – training the ART network

References :

- Yagnanarayana B., Artificial Neural Networks.- PHI, 2001.
- Beale, R ; Jackson, T., Neural Computing :an Introduction.- Adam Hilger.
- Wasserman, Philip D., Neural Computing :theory and practice., Van Nostrand and Reinhold,
- Freeman, James A; Skapura, David M., Neural Networks: algorithms, applications, and programming techniques. – Bangalore: Addison-Wesley, 1991.

COS5015 DATA COMPRESSION

Module I: Basic techniques: Instructive compression, Run-Length Encoding, RLE compressions, scalar quantization. Statistical Method: Huffman Coding, Adaptive Huffman coding, facsimile compression, arithmetic coding, adaptive arithmetic compression, text compression Dictionary methods: String compression, Repetition Times, Repetition Finder, Unix Compression, GIF Images, ZIP and GZIP, CRC.

Module II: Image Compression: JPEG, JPEG-LS, Vector quantization, adaptive Vector quantization, Block Matching, Differential Loss less Compression,, Block decommission. Video Compression: Analog Video, Digital Video, MPEG Audio Compression: ADPCM Audio compression, MPEG-1 Audio Layers

Reference:

- David, D Salomon., Data compression, the complete reference. - Springer, 2000.
- Nelson, Mark; Gailly, Jean-loup., The data compression book.2ed. - New Delhi:BPB, 1996.

COS5016 DIGITAL IMAGE PROCESSING

Module I: Image Representation-Fundamental steps in image processing, elements of DIP Systems. Digital image fundamental-Visual perception-image Model-sampling and quantization-pixel relationships-image geometry-photographic Film Image Transforms: Fourier transforms-discrete transforms-properties of 2d fourier transforms-FFT-other separable image transforms. Image Enhancement: spatial, frequency-Domain methods-Enhancement by point processing-spatial Filtering-Enhancement in the Frequency domain-specifications-color image processing.

Module II: Image Restoration: Degradation model-diagonalization of circulant and block circulant metrics-algebraic approach to restoration-inverse filtering-wiener filter-constant Least Square Restoration

Reference

- Gonzalez, Rafel C; Woods, Richard E.; Eddins, Steven, Digital Image Processing using MATLAB.- Pearson Education Asia, 2004.
- Jain, Anil K., Fundamentals of Digital Image Processing.- PHI, 1998.
- Panneerselvam ,R., Operations Research.- PHI,2002.

COS5017 SYSTEMS AND COMPUTATIONAL MODELING

Module I: Introduction to analysis and modeling, Systems Modeling Principles, population Model-Calibration and Validation, Deterministic Models, Small Arms Exterior Ballistic Model, Inventory Systems Model-Shaping Dynamic Response, Modeling Corporate Assets

Module II: Stochastic Models, work physiology model, macro model blue glacier, state water-planning model, prototyping A Forest Systems Model, Applications Unlimited.

Reference

- Boyd, Donald W.,Systems analysis and modeling: a macro-to-micro approach with multidisciplinary applications. - Harcourt India, 2001.

COS5018 MATLAB

Module I: Environment-Matrices and vectors, strings, input and output statements, plotting in MATLAB. Script Files. Programming in MATLAB: Control Flow, functions, structured data types, file input and out put

Module II: Graphics: 2D Plots, 3D Plots, handling graphics, saving and printing, animation. Miscellaneous MATLAB Functions and variables: Time, Date, Evolution, Sound etc. Applications: Polynomials, curve fitting, solving equations etc.

Reference:

- Sigmon, Kermit., MATLAB primer. – London: CRC, 1994.
- Rudra Pratap., Getting started with Matlab : a quick introduction for scientists and engineers. - Oxford University Press, 2002.
- Matlab Manual, MATLAB Inc.

COS5019 VISUAL PROGRAMMING

Module I: Introduction : The integrated Development Environment – menu bar, tool bar, form designer, project explorer, properties window, form layout window, The VB editor. Programming in VB: Data types, variables, declarations and scope, arithmetic operators, string operators, study of form and code modules, private and public procedures, Main() procedure. Subs and Functions. Mathematical and string functions; Branching and Looping statements; If...Then...Else and Nested If statements, Select case-different forms; For...Next, While...Wend and Do – loops statements; Arrays – declaration. Static and Dynamic arrays. Array() function; Menus and toolbars – Creating menus and toolbars, Working with the menu editor, designing multiple document interface forms. OOP methods and properties of an object, class modules, encapsulation and inheritance characteristics; dynamic link libraries(DLLs) and Windows API, Designing Help files, File handling – Sequential, Random and Binary files, Database connectivity – Tables and Queries, ActiveX Data objects.

Module II: Introduction to VC++: Visual C++ components, Visual work Bench, App-studio, C/C++ compiler, Linker, Resource compiler, Debugger, App Wizard, Class Wizard, Source Browser MFC, Application Frame work.

References:

- Petroustos, Evangelos. Mastering visual basic - BPB, 1997.
- Azam, Mohammed., Programming with Visual Basic 6.0. New Delhi: Vikas Publishing House, 2000.
- Roselman B., Peasley R., and Pruchniak W., Using Visual Basic, PHI.
- Bronson, Gary j; Menconi, Stephen J., A first book of C, fundamentals of C programming. - Jaico publishing house, 1989.
- Kruglinski, David ., Inside Visual C+.- Microsoft Press, 1992.

COS5020 SOFTWARE PROJECT MANAGEMENT

Module I: Product: The evolving role of software-an industry perspective-aging software plant software competitiveness. Software - characteristics-components-application-crisis on the horizon-software myths. Process: Process-methods-tools-a generic view of software Engineering-software process models-linear sequential model- proto typing model- RAD model- incremental, spiral, component, assembly and concurrent development models. Project Management concept: People – Product-Process-Project

Module II: Software process and project metrics: - Measures- Metrics and indicators- Software measurements-metrics for software quality- integrating metrics within the software process. Software project planning: Planning objectives - software scope-resources software project estimation- Decomposition Techniques –Empirical estimation models- COCOMO model-automated estimation tools. Risk management: software risks-risk identification-risk projection-risk mitigation, monitoring and management-safety risks and hazards-RMMM plan.

Module III: Project scheduling and tracking: Basic concepts-relation between people and effort defining task set for the software project-selecting software engineering task-refinement of major task-defining a task network-scheduling-project plan. Software quality assurance-quality concepts-software reviews-formal technical review-Formal approaches to SQA- software reliability-SQA plan-the ISO 9000 quality standards. Software configuration management: baselines-software configuration item-the SCM process identification of objects in software configuration-version control-change control configuration audit-status reporting-SCM standards.

References:

- Royce, Walker., Software Project management: a unified framework.-Pearson Education
- Jalote. Pankaj., Software Project management in practice.- Pearson Education
- Berkun, The art of Project Management, Shroff Publishers
- Kelkar, S A., Software Project management: a concise study, PHI
- Cottorell, Mike ; Hughes, Mike., Software Project management –
- Sommerville, Ian., Software engineering. 4 ed. - Addison-wesley, 1994.
- Furtrell, Robert T; Shafer, Donald F; Shafer, Linda I., Quality software project management. - Pearson Education Asia, 2002
- Pressman, Roger S., Software engineering, a practitioner's approach.6 ed. - MCH, 2005.