C0047
18

Price:- 10 Rs.

॥ अंतरी पेटवू ज्ञानज्योत ॥

North Maharashtra University, Jalgaon

Syllabus for Third Year Engineering Degree Course

INFORMATION TECH.

w.e.f. July,2001

C:\ENGINEERING\COVERPAGE.doc\PRAMOD CHAVAN

North Maharashtra University, Jalgaon

T.E. (Information Technology)
Term I

Sr. No	Subject Code	Subject	Teaching Scheme Hours/Week		Examination Scheme				
			Lectures	Practical	Paper Duration Hours	Maximum Marks			
						Paper	TW	PR	OR
1		Microprocessors and Interfacing	4	2	3	100	25	25	-
2		Data Communication	4	-	3	100	25	-	-
3		Systems Programming	4	2	3	100	25	25	-
4		Data Base Management Systems	4	2	3	100	25	25	-
5		Multimedia Techniques	4	2	3	100	25	-	-
		Total	20	8	-	500	125	75	-
		Grand Total	28		-	700			

* Each Unit carries 20 Marks.

Term II

Sr. No	Subject Code	Subject	Teaching Scheme Hours/Week		Examination Scheme				
			Lectures	Practical	Paper Duration Hours	Maximum Marks			
						Paper	TW	PR	OR
1		Computer Networks and Internet	4	2	3	100	25	25	-
2		Computer Graphics	4	2	3	100	-	-	-
3		Software Engineering	4	2	3	100	25	25	-
4		Operating Systems	4	2	3	100	25	-	-
5		Web Designing	4	2	3	100	25	25	-
6		Practical Training / Special Study / Minor Project	-	-	-	-	25	-	-
		Total	20	10	-	500	125	75	-
		Grand Total	30		-	700			

* Each Unit carries 20 Marks.

Microprocessors and Interfacing

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 marks

Unit 1:
8086/8088 CPU architecture, Programming model, Segmentation, Addressing modes, Instruction set, Assembly language programming, BIOS and DOS interrupts.

Unit 2:
8086 configurations, Basic 8086 configuration, Minimum and Maximum modes, 8086 CPU read/write timing, Main memory design, Address decoding techniques.

Unit 3:
8259A PIC, 8255 PPI, Keyboard interfacing, Seven Segment Display interfacing, 8279 Keyboard/Display controller.

Unit 4:
8254 Programmable Interval Timer, Principle of DMA, 8237 DMAC, 8251 USART, 8272 Diskette Controller.

Unit 5:
Introduction to 32 bit processor - 80386 Architecture, Addressing Modes, Memory Management, Protection Mechanism, Operating Modes - Real, Protected, and V86, Introduction to Pentium family Architecture.

References:

1. Douglas V. Hall, "Microprocessors and Interfacing - Programming and Hardware", 2nd Ed., TMH.
2. Liu, Gibson, "Microprocessor Systems: The 8086/8088 Family, Architecture, Programming, and Design", PHI.
3. Brey, "The Intel Microprocessors 8086/8088, 80186, 80286, 80386, and 80486, Architecture, Programming and Interfacing, PHI.
4. Allen Wyatt, "Assembly Language Programming", QUE.
5. Peter Abel, "Assembly Language Programming", PHI.

Web sites

http://www.intel.com

Laboratory Assignments:
Assembly Language Programming of 8086:
1. Hex-BCD conversion.
2. BCD-Hex conversion.
3. BCD addition.
4. String Manipulation and Text Processing.
5. Program using NEAR procedure.
6. Calling External FAR procedure.
7. Program using MACRO.
8. Array sorting using bubble sort.
9. Assignment on .COM file.
10. TSR program.

Students will submit the term work in the form of journal. Practical examination will be based on above assignments and questions will be asked to judge the understanding of assignments performed at the time of examination.

Data Communication

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks

Unit 1:

Data Communication, Components, Networks, Distributed Processing, Network Criteria, Applications, Protocols, and Standards, Standards Organizations.

Basic concepts: Line Configuration: Point to point, multi-point, Topology: Mesh, Star, Tree, Bus, Ring, Hybrid topologies, Transmission Mode: Simplex, Half Duplex, Full Duplex, Categories of Networks: LAN, MAN, WAN, Internetworks.

Unit 2:

The OSI Model:

Layered Architecture, name, function, and content of each layer.

Signals and Encoding:

Aperiodic and Periodic signals, Analog and Digital Signals, Encoding: Digital to Digital Encoding, Digital to Analog Encoding, Analog to Analog Encoding, Analog to Digital Encoding.

Interfaces and Modems:

DTE-DCE Interface, EIA 232 Interface, Other Interface Standards, EIA-449, EIA-530, X.21.
Modems: Transmission rate and modem standards.

Unit 3:

Transmission Media and Multiplexing:

Transmission Media:

Guided media, unguided media, performance, Twisted pair, Coaxial cable, Optical fiber, RF allocation, Radio waves, Microwaves, Satellite communication, Cellular telephony.

Multiplexing:

Many to one and one to many.
Types: SDM (Space Division Multiplexing)
FDM (Frequency Division Multiplexing)
TDM (Time Division Multiplexing)
Multiplexing application, Telephone systems.

Unit 4:

Error Detection and Correction:

Types of Errors, Detection: Redundancy, VRC, LRC, CRC checksum.
Error Correction: Single bit, Hamming code, Multi-bit error correction.
Data Link Control,
Line Discipline: ENQ / ACK,
Flow Control: Stop and Wait, Sliding Window,
Error Control: ARQ, Stop and Wait ARQ, Sliding Window ARQ.

Unit 5:

Data Link Protocols:

Asynchronous Protocols:
XMODEM, YMODEM, ZMODEM, BLAST, Kermit.
Synchronous Protocols:
Character Oriented Protocols: BSC, BSC Frames, Data Transparency.
Bit Oriented Protocols: HDLC, Frames, Link Access Procedures.
X.25 Protocols. X.25 layers, Packet Layer Protocols.

Local Area Networks: IEEE 802.1, LLC, MAC, PDU.
Ethernet: CSMA / CD, Addressing and Frame format.
Token Bus and Token Ring, FDDI (Fiber Distributed Data Interface).

References:

1. Behrouz A. Forouzan, "Introduction to Data Communication and Networking", TMH.
2. William Schweber, "Data Communication", McGraw Hill.
3. Leon Garcia, Widjaja, "Communication Networks Fundamental Concepts and Key Architectures", TMH.

Systems Programming

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 marks

Unit 1:
Introduction:
Definition, Components of system software, Evolution of system software, Language translators, batch monitors, multiprogramming operating system, Evolution of programming system.
Assemblers:
Structure of an assembler, Design of Two Pass assembler (8085 as reference), Single Pass assembler - Table of incomplete instruction, back patching, Cross-assembler.

Unit 2:
Macro Processor:
Macro instructions, Features of a macro facility, Design of two pass macro processor, Implementation of nested macros (Macro call inside definition, definition inside definition).
Linkers and Loaders:
Schemes: Compile and Go, General Loader scheme, Absolute Loader, Subroutine linkages, Relocating Loaders, Direct Linking Loader, Dynamic Linking Loader, Overlay structure, Design of: Absolute Loader, Direct Linking Loader, Implementation example - MSDOS Linker.

Unit 3:
Compiler:
Compiler phases (Introduction with Input / Output for each phase must be dealt with), Concept of Cross compiler (Introduction only), Features of machine dependent and independent compilers, Types of compilers with definitions only, Interpreters.

Unit 4:
Software Tools:
Tools for program testing, Text Editors - Screen Editor, Line editor, Word Processors, Debug Monitors.
Operating system Structure:
Operating System components, System calls, OS services: File Management, Memory Management, Device Management, Process Management, system calls, Process Scheduling.: Long term, Short term, Middle term scheduler, Interprocess communication: Direct communication, Indirect communication, Buffering.

Unit 5:
Dynamic Linking in Windows:
Concept of Clip board, Dynamic data exchange, Dynamic Link Libraries (DLL) - The need, Conventional dynamic linking, libraries, the class library, dynamic linking, name mangling and DLLs, the use of call back functions, far function prologs, Different methods of specifying link, Dynamic linking with and without import, Object Linking and Embedding (OLE) - Basic idea.

References:

1. L. Beck: "System Software: An Introduction to System Programming", 3rd Ed., AWP - 1977.
2. John Donovan: "Systems Programming", McGraw Hill.
3. Dhamdhere: "System Programming and Operating System", TMH.
4. Peterson: "Operating System Concepts".
5. Charles Petzold, "Programming Windows 95", Microsoft Press.

Laboratory Assignments:
Develop a program in C or C++ for the following:
1. Assembler for 8085 / 8086.
2. Augment the above program to support macros.
3. Design of simple loader.
4. Simple text editor.

Database Management Systems

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 Marks

Unit 1:
Introduction to DBMS:
Basic concepts, Advantages of a DBMS over file processing systems, Data abstraction, Data models and Data independence. Components of a DBMS and overall structure of a DBMS. Data base terminology.

Database Administration Issues: DBA role, Indexes, Data dictionary, Security, Backups, Replication, SQL support for DBA, Commercial RDBMS selection.

Data Modeling

Basic Concepts, Types of data models, E-R data model and Object-Oriented data model, Relational, Network and Hierarchical data models and their comparison, E-R and EER diagramming.

Unit 2:

Relational Model:

Basic concepts, Attributes and Domains, Interaction and extensions of a relation, Concept of integrity and referential constraints, Relational query languages (Relational algebra and relational calculus), Concepts of View and triggers.

Unit 3:

SQL

Structure of a SQL query, DDL and DML, SQL queries, Set operations, Predicates and Joins, Set membership, Tuple variables, Set comparison, Ordering of Tuples, Aggregate functions, nested queries, Database modification using SQL, Dynamic and embedded SQL and concept of stored procedures, Query optimization.

Unit 4:

Relational Database Design:

Notion of a normalized relations, Normalization using Functional Dependency, Multi-valu dependency and Join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.

Transaction Management:

Basic concept of a transaction, Components of transaction management (Concurrency control and Recovery system), Different concurrent control protocols such as time stamps and locking, Different crash recovery methods such as log based recovery and shadow paging, Concepts of cascaded aborts, Multi-version concurrency control methods.

Unit 5:

Object Oriented DBMS:

Review of Object Oriented concepts: Objects, Classes, attributes, messages, inheritance and polymorphism etc., Object Schemes, Class-Subclass relationships, interobject relationship, Features of Object-Oriented DBMS and ORDBMS, Concept of OID, Persistence of objects in OODBMS, Physical organization, Object-Oriented queries, Schema modifications, Temporal Databases, Active Databases.

Database Systems Architecture:

Centralized, Client Server System, Parallel systems, Distributed Systems, Web enabled system.

New Applications:

Need for data analysis, Decision support systems, Data warehouse, On-line Analytical processing (OLAP), Data mining concepts, Spatial and Geographic databases, Multimedia databases.

References:

1. Henary F. Korth, Abraham Silberschatz, "Data base System Concept", Third Ed., Mc-Graw Hill Inc., New York.
2. J. Date, "Introduction to Database Management Systems", Sixth Ed, Narosa Publishing House.
3. Groff James R., Paul Weinberg, "LAN times guide to SQL".
4. Bipin Desai, "Introduction to Database Management Systems", Galgotia.

Laboratory Assignments:

1. Creating a sample Database application using conventional file processing mechanisms and "C" language. The program should provide facilities for retrieving, adding, deleting and modifying records.
2. Prepare an E-R diagram for the given problem definition. Prepare and verify a relational database design using concepts of normalization techniques in appropriate normal form.
3. Creating a sample database file and indexes (for the design made in experiment no. 2) using any client server RDBMS (ORACLE/Sybase) package using SQL DDL, queries. This will include constraints (key referential etc.) to be used while creating tables.
4. SQL DML queries: Use of SQL DML queries to retrieve, insert, delete and update the data base created in experiment no. 3. The queries should involve all SQL features such as aggregate functions, group by, having, order by, sub queries and various SQL operators.
5. Screen Design and Report Generation: Sample forms and report should be generated using Developer 2000 (in case of ORACLE) or through Power Builder or Visual Basic Front and tools or any prototyping software engineering tool.
6. Case Study of MIS
7. Prototype of OODBMS/Active Database/Temporal Database in C++.

Multimedia Techniques

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks

Unit 1:

Introduction:

What is multimedia? Multimedia application, Goal and Objectives, Multimedia building blocks, Multimedia and Internet.

Multimedia Configuration:

Multimedia PC work station components, Multimedia platform, Multimedia Development Tool, Authoring Tool, Interactivity, High end Multimedia architectures.

Multimedia Operating System:

File System: File format, TIFF, BMP, PCX, GIF, JPG, MPEG etc.

Process management: Multimedia communication system, Multimedia database management system.

Unit 2:

Multimedia Audio:

Basic sound concepts, audio capture, music, speech, sound processor, sound recovery technique, VOC4, WAV, MP3 file formats for sound.

Multimedia Graphics:

2D / 3D animation fundamentals, color modules, Digital Imaging, Still and Moving images, Video capture, animation, video processing, video recovery techniques, AVO, AVI file formats, NTSC, PAL, SECAM, HDTV system, Video / audio conferencing techniques and standards, Video streaming, Motion of synchronization.

Unit 3:

Image Compression Techniques:

LZW, DCT, Run Length Encoding, JPEG, MPEG standard, Hypertext MPEG, Hypertext and Hypermedia, Document architecture, ODA, MHEG.

Unit 4:

Augmented and Virtual Reality and Multimedia:

Concept, VR devices: Hand gloves, head mounted tracking system, VR chair, CCD, VCR, 3D sound system, Head mounted displays and rendering software setup, Virtual Objects, VRML.

Unit 5:

Multimedia devices:

Mass storage systems for Multimedia - requirements, Magnetic devices, Optical devices, CDROM, DVD, Scanners - Types and specifications.

Windows support to Multimedia:

Multimedia databases, Multimedia function calls, windows support for sound, animation, movies, music, and MIDI controls.

References:

1. R. Steinmetz, K. Nahrstedt, "Multimedia: Computing, Communication and Applications", Prentice Hall - PTR Innovative Technology Series.
2. J. Jeffcoate, " Multimedia in Practice: Technology and Application", PHI.
3. M. J. Young, "Windows Multimedia and Animation with C++ Programming for Win 95, NT", AP Professional.
4. K. Jams, P. Schmauder, N. Yee, "VRML Programmer's Library", Galgotia.
5. J. Gradicki, "Virtual Reality Construction Kit", John Wiley and Sons.
6. A. Jarol, "Visual C++ Multimedia Adventure Set", Coriolis Group Books.

Web sites

http://www.msdn.microsoft.com
http://www.vodi.com

Laboratory Assignments:

1. Use of Multimedia workstation and its components, installation process, use of Microsoft Multimedia Development Kit.
2. Create, Edit .VOC file and convert it to .WAV format, save it.
3. Create, Edit .WAV file and convert it to .VOC format, save it.
4. Run a Video clip using Windows Active Movie Controls.
5. Use of 3D Studio and its features.
6. Write a tool to create presentation slide with audio and video effects.
7. Using VRML generate following virtual scene:

a. Coffee House.
b. Building Models
c. Furniture Models.

8. Write a tool to display .bmp, .gif, .jpeg files
9. Write an audio file editor for any of the audio formats.
10. Conversion of a video stored on VHS tape (normal video cassette) to Mpeg.
11. Study of Video tape formats E.g. 2 inch, 1 inch, ¾ inch U-matic, ½ inch, 8mm Hi-8 etc, and study of Video Cameras, Recording schemes, Video quality and digitization of Video

The assignments (any 6) are to be performed using VC++ 6.0/Java(Assignment number 7, 8, 9, 11 are compulsory)

Computer Networks and Internet

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 marks

Unit 1:

Categories of Networks - Data, Voice, Video, Multimedia, Internet, Intranet, Repeaters, Bridges, Routers, Gateways, Servers, Transmission media and its specifications. Network software, Protocols and Service. Switching - Switch hierarchy, crossbar switches, space division switches, blocking / non-blocking switches, Circuit switching.

Data Link Layer:

Design Issues - services provided to the network layer, Framing, Error control, Flow control, Elementary Data Link protocols - Unrestricted Simplex protocol, Simplex Stop-and-Wait protocol, Simplex protocol for a noisy channel, Sliding window protocols - One bit, Go back n, selective repeat.

Unit 2:

Medium Access Sublayer:

Channel allocation problem - Static and Dynamic channel allocation in LAN/MAN.
Multiple Access Protocols - ALOHA, CSMA/CD, Collision free protocol, Wireless LAN protocols, IEEE standard 802.3, 802.4, 802.5, and their comparison.
Bridges - Transparent, Spanning Tree, Source routing, Remote Bridges.
High Speed LANs - FDDI, Fast Ethernet.

Unit 3:

Network Layer:

Design issues, Routing algorithms - shortest path, Flooding, Flow-based, Distance vector, Link state Routing, Routing for mobile hosts, Congestion Control Algorithms - Principles, Prevention Policies, Traffic Shaping.

Transport Layer:

Transport Services, Elements of Transport Protocols - Addressing, establishing / Releasing a connection, Flow control and buffering.

Unit 4:

TCP/IP:

Internetworking, Virtual circuits, connectionless internetworking, Tunneling, Internetwork Routing, Fragmentation, firewalls, TCP/IP Reference Model, Network Layer in the Internet - IP Protocol, IP addresses, Subnets, Masking, Internet Control Protocols - ICMP, ARP, RARP, Internet Multicasting, Mobile IP, CIDR, IPV4, IPV6, Internet Transport Protocols - TCP Service Model, TCP protocol, TCP Segment Header, TCP connection Management, TCP transmission policy, TCP Congestion Control, UDP, Data Link Layer in the Internet - SLIP, PPP.

Unit 5:

ATM:

Narrowband ISDN - ISDN Services, System Architecture, ISDN Interface, Broad Band ISDN and ATM, B-ISDN ATM Reference Model, Transmission in ATM networks, ATM switches, Data Link Layer in ATM, Network Layer in ATM networks - cell formats, connection setup, Routing and Switching, Traffic shaping and Policies, Congestion Control, ATM LANs, ATM AAL Layer Protocols - AAL 1, AAL 2, AAL 3/4, AAL 5, their comparison.

Internet and Applications:

DNS, Electronic Mail, World Wide Web, DHCP, FTP, HTTP.

References:

1. Andrew S. Tanenbaum, "Computer Networks", 3rd Ed., PHI.
2. Behrouz A. Forouzan, "TCP/IP Protocol Suite", McGraw Hill.

3. ED Taylor, "Networking Handbook", TMH
4. Behrouz A. Forouzan, "Introduction to Data Communication and Networking", TMH.
5. Douglas E. Comer and David L. Stevens "Internetworking with TCP/IP - Vol. I, II, and III", PHI.
6. Leon Garcia, "Communication Networking", TMH

Laboratory Assignments:

1. Implementation of Data Link Layer Protocols, e.g. stop and wait protocol, sliding window protocol, and pipelining protocol.
2. Implementation of Network Layer functions, e.g. writing software for Routing Algorithms and Flow Control Algorithm.
3. TCP/IP socket programming.
4. Win socket programming.
5. Writing TCP/IP application like TELNET, Ping, FTP, Remote Execution.
6. Implementation of Network Security Algorithm, e.g. Data Encryption Standard and Ciphers.
7. Implementation of Application Layer, e.g. E-Mail.
8. Configuration of any two of the following:
   Router, DNS, Proxy Server, Web Server, Mail Server.
9. Data compression and Decompression (RLE, Huffman's coding)
10. Case study of existing networks, Study of network components and resources.
11. Implementation of ALOHA / CSMA/CD protocols.

Total 8 assignments to be completed with assignment no.1, 2, 3, and 8 compulsory.

Computer Graphics

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks

Unit 1:

Basic Concepts:

Introduction to Computer Graphics, types of graphics devices, Display file structure, Display file Interpreter, Display Processors, Graphics file format – BM, TIFF, PCX, GIF.

Interactive Graphics:

Graphics Standards, Graphics hardware, CRT display and controller, Interlaced and Non-interlaced display, Vector Scan and Raster Scan, Display Adapter – VGA, SVGA, Bios Video support, Graphics device drivers, Display buffers, Plotters, Digitizer, Scanners, Light pen.

Line and Circle Generation:

Line generation – DDA and Bresenham's Algorithm, Thick line segments, Antialising of lines, Circle generation - DDA and Bresenham's Algorithm, Character generation: Stroke Principle, Starburst Principle, Bit map Method.

Unit 2:

Polygons:

Types, representations, entering Polygons, Polygon Filling: Seed fill, Edge fill, Scan conversion Algorithm.

Scan conversion: real time scan conversion, Solid area scan conversion, Run length encoding, Cell encoding.

Segments:

Concepts, Segment table, Segment Creation, Deletion, Renaming, Image Transformation.

Unit 3:

3D Geometry.

2D transformations Primitives and Concepts – Translation, Rotation, Rotation about an arbitrary points, Scaling and Shearing, 3D transformations, Rotation about an arbitrary axis, 3D viewing transformations, Concept of Parallel and Perspective Projections, Viewing Parameters, 3D clipping, Mid-Point subdivision Algorithm.

Unit 4:

Windowing and Clipping:

Viewing Transformation, 2D clipping, Sutherland-Cohen subdivision line clipping Algorithm, Midpoint subdivision Algorithm, Generalized clipping, Cyrus-Beck Algorithm, Interior and Exterior clipping, Polygon Clipping, Sutherland-Hodgman Algorithm.

Hidden surfaces and Lines:

Back-face removal Algorithm, Hidden line Methods, Z-Buffer, Warnock and Painters Algorithm, Floating Horizon.

Unit 5:

Light, Color and Shading:

Diffused Illumination, Point Source Illumination, Shading Algorithm, Color models – RGB, HVS, CYM etc., Eliminating back faces, Transparency, Reflection and Shadows.

Curves and Fractals:

Curve generation, Interpolation, Interpolating Algorithms, Interpolating Polygons, B-Splines and Corner, Bezier curves, Fractals, Fractal surfaces and lines.

Graphical User Interface:

Concepts of X-Windows, Concept of Client-Server Model, Protocols, Message Passing (only Gui related concepts), Motif – widget, gadget structure (only GUI concepts), Concepts of MS Windows, OpenGL: Why 3D?, Why OpenGL?, OpenGL and Animation.

Graphics Standard: Introduction to Graphics kernel system with basic Primitives.

Graphics Applications. Scientific and Engineering Applications, Business Applications, Application concept in Animation and Simulation.

References:

1. David F. Rogers, "Procedural Elements for Computer Graphics", Mc-Graw Hill International Editions.
2. Steven Harrington, "Computer Graphics A Programming Approach", Mc-Graw Hill International Editions.
3. Foley, Vandam, Feiner, Hughes, "Computer Graphics Principles and Practice", Addison Wesley.
4. Rao, Prasad, "Graphical user Interface (GUI) with X-Windows and MOTIF", New Age International limited Publisher.
5. Charles Petzold, "Programming Windows 95", Microsoft Publication.
6. Ron Fosner, "Open GL"

Laboratory Assignments:

1. Line/Circle drawing.
2. Polygon Filling.
3. 3D Transformation.
4. Segmentation.
5. Projections
6. Animation.
7. Windowing and Clipping Algorithm.
8. Polygon Clipping Algorithm.
9. Hidden line and Surfaces.
10. Curves and Fractals.
11. Programming of Display device drivers for various cards using Windows environment.
12. Study assignment on any latest GUI applications or Mini Project.

Programs must be designed using device independent graphics principles. Assignment number 11 and 12 compulsory. Staff member should frame minimum eight assignments based on the above topics.

Software Engineering

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 Marks

Unit 1:

Software and Software Engineering.

What is and Why Software Engineering? Product: evolving role of software, Software characteristics, components, applications, Software crisis and myths, Software engg. Processes, Software development phases and software process models. Prototyping and RAD models, Waterfall, incremental model, spiral model, 4GT model, CASE tools and classifications.

Unit 2:

Planning and Management of Software Projects:

(Only basic concepts)

People, Problem and Process, measures, metrics and indicators, metrics for software quality, scooping, Software project estimation, make-buy decisions, software acquisition, Software risks: identification, projection, assessment, monitoring, project scheduling and tracking tasks/work breakdown structures, timeline chart, project plan, CASE tools.

Systems Engineering:

Computer based systems, system engineering hierarchy.

Information Engineering: Information strategy, planning, enterprise modeling, business area analysis, information flow modeling, Product engineering: system analysis, feasibility study, economic and technical feasibility analysis, modeling system architecture diagrams, CASE tools.

Unit 3:

Requirement Analysis:

Communication techniques, FAST, Quality deployment, analysis principles, modeling, partitioning, prototyping, specifications, SRS and SRS reviews analysis models: data modeling, functional modeling and information flow, Data flow diagrams, extensions to real-time systems, behavioral models, mechanisms of structured analysis, ER diagrams, control modeling, data dictionary, CASE tools.

Unit 4:

Design Fundamental:

Software design and software design process, principles and concepts, abstraction, refinement and modularity, software architecture, control hierarchy, partitioning, data structure, information hiding, effective modular design, cohesion, coupling, design module, design document, CASE tools.

Design Methods:

Architectural design and design process, transform and transaction flow, design steps, interface design, procedural design, graphical and tabular design notations.

Software Testing and Testing Strategies:

Software testing fundamentals, test case design, White-box, Black-box testing, control structure testing, strategic approach to testing, strategic issues, unit testing, integrated testing, validation testing, system testing, CASE tools.

Unit 5:

Object Oriented (OO) Software Engineering.

Planning: OO paradigms and concepts, identifying elements of object model. Object oriented analysis (OOA) and OOD: Conventional Vs. OO, generic components of OO Analysis model, OOA process, Object-relationship model, Object-behavior model. Human Computer interface (HCI) components, Object design process, design patterns, CASE tools.

Unified Modeling Language (UML):

Different Methods: Rambaugh/Booch/Jackobsons, need for standardization, Diagramming in UML (Use Case, Class, interaction, State diagrams), CASE tools.

Software Quality Assurance:

Software quality concepts, Software quality assurance (SQA) and approaches, Software Reliability, SQA plan, ISO 9000 and SEI standards for software, Software configuration management (SCM), base lines, Scan process, Version control, change control, SCM audits, CASE tools.

References:

1. Roger Pressman: "Software Engineering, A practitioner's Approach", 5th Ed., Tata McGraw Hill Publication Company.
2. Sommerville: "Software Engineering".
3. Pankaj Jalota: "Software Engineering".
4. Martin Fowler: "UML Distilled", Addison Wesley.
5. Rambaugh: "OO modeling and design", PHI.
6. Pfleeger S. L.: "Software Engineering".

Web sites

http://www.rationalrose.com
Visit the Carnige Mellon University web site

Laboratory Assignments:

For a given problem definition, perform Object-Oriented analysis and Design activities. Make use of Object-oriented analysis and design tools (such as Rational Rose, Object Analyst, etc.) and provide an object-oriented design. (Minimum 4 assignments.)

Operating Systems

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks

Unit 1

Introduction:

Need of OS, evolution of OS, types of OS like Batch, Time sharing, Multiprogramming, Multitasking, Distributed and Real time.

OS views and concepts. Shell command language, System calls, User view, Functional requirement and structure, Monolithic, Layered, Vertical model

Processes and Processor Management.

Process concept, interleaved I/O, CPU burst, Process state, OS services for process management, Threading.

Unit 2

Scheduling:

Process Scheduling - long term, middle term and short term scheduler, Scheduling Algorithms and performance evaluation. Inter-process communication and synchronization needs, Mutual exclusion, Semaphores. Critical regions – Monitors, messages for inter-process communication and synchronization. Classical problems in concurrent programming.

Dead lock – Principle, detection, prevention, avoidance and recovery, Banker's Algorithm.

Unit 3:

Process Management in UNIX:

Structure of process, process control, process system calls (No algorithms) - Fork, Join, Exec, System boot and Init process, Shutdown process.

Memory Management:

Types, contiguous and Non-contiguous, Segmentation, Paging concepts, Virtual memory and its management (Allocation, Fetch, Replacement).

Unit 4:

Memory Management in UNIX:

Policies, Swapping and Demand paging.

File Management:

Organization, Concepts, Files and Directories, Hierarchical structure of files and space allocation, File space management, Security issues, Protection mechanism.

File Management in UNIX:

Internal representation of files, Inodes

Unit 5:

File structures in UNIX:

Structure of various files, directories, superblock, inode assignment to a new file, Allocation of disk blocks, System calls, file creation, pipes.

I/O Management:

I/O problem, I/O hardware, I/O interfaces, Buffer register, Buffer commands and design issues.

Distributed OS:

Fundamental concepts, system modules, Issues in designing Distributed OS in brief.

References:

1. Peterson, Operating System Concepts,
2. Milenkovic, Operating System Concepts and Design, McGraw Hills
3. Batch M. J., The Design of UNIX Operating System, PHI
4. Godbole, Operating Systems,
5. Sinha P.K., Distributed Operating Systems Concepts and Design, PHI
6. Steven, Advanced UNIX Programming
7. Donovan John, Operating Systems, TMH
8. Tannebaum, Operating Systems

Web sites

http://www.linux.com

Laboratory Assignments:

1. Study of various commands in UNIX/Linux.
2. Command Interpreter.
3. CPU Scheduling.
4. Memory Management.
5. Deadlock: Banker's Algorithm.
6. Interprocess Communication using Message Queue.
7. Installation of Linux: Workstation as well as Server.
8. Linux System Administration.
9. Web Server Configuration.
10. Mail Server Configuration

Any 8 assignments on above topics. (Assignment no. 7 compulsory).

Web Designing

Teaching Scheme:
Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Examination Scheme:
Theory: 100 Marks
Term work: 25 Marks
Practical: 25 marks

Unit 1:

Basics of Web Design, Marketing on Internet, Developing Effective Web Strategy, Domain Name issues (choosing, registration etc), Server issues: Discuss pros and cons of having own server with hiring server, virtual domain hosts, Laying foundations for the web site, Web Design process, Web site user requirements and interaction.

Unit 2:

Web site organization, site types and architecture, navigation theory and practice, Use of graphics, Making site appealing, Search and Design, site maps, indexes, other Navigational and use Aids, Basics of Web Page Design: Page types, layouts, text and fonts, color, images and backgrounds. Making use of Mail delivery systems, online customer services, online payments.

Unit 3:

History of HTML, DTD, CSS, HTML document representation, character encoding set, HTML elements, attributes, entity references (numeric, character)

Structure of HTML document, discuss all block level tags, text level tags, linking tags, images maps, tables, frames, forms, integration with CGI, integrating components in a HTML page.

Unit 4:

Web mastering skills and Roles: Internet specialist, information design scientist, media designer, technical designer, technical manager etc., Web site security issues, web site evaluation procedures.

Unit 5:

Introduction to XML, XML advantages, XML Implementations, XML approach to web designing, logical and physical structures of XML documents, XML prolog, DTD, elements, attributes, entities, linking in XML, Style sheets, XML processor, Morphing HTML into XML.

References:

1. Thomas A Powell, "The Complete Reference – Web Design", TMH.
2. Creating Commercial Web sites, ISBN 1575211696.
3. James L. Mohler, " Teach yourself How to become a Webmaster in 14 days", Samanet, Techmedia
4. Richard Light, "Presenting XML", Sams, Macmillan Computer Publishing.

XML standards specification from w3.org should be used

Web Sites:

1. http://www.htmlcodetutor.com
2. http://www.netscape.com
3. http://www.xml.com
4. http://www.w3.org

Note:

For HTML use any standard book on HTML 4.0 plus refer the HTML 4.0 standards from W3.org

Laboratory Assignments:

1. Detail study of at least one of the web browsers: PWS, IIS, Apache, Java web server.
2. Detail study of any HTML authoring tool: Netscape composer/ Front page/ First Page etc.
3. Detail study of one imaging tool like Adobe Photoshop, Ulead Photo Impact or decided by the Teacher and one animation tool like Ulead GIF animator or equivalent animator software.
4. Design, publish a web site with not less than 15 full size pages for a selected topic (commercial, Institute, Portal or decided jointly by the student and teacher). Exercise the web mastering skills in various phases of the development of the site
5. Develop an XML application for Inventory control, Museum information system or on the topic given by teacher.

Practical Training / Special Study / Minor Project

Examination Scheme:
Term work: 25 Marks

Every student needs to complete following requirements for term work of Practical Training / Special Study / Minor Project.

Practical training in any industry for a period of minimum two weeks and submit training report certified by personnel manager or works manager or any other higher authority of that industry.

OR

Special study on a recent topic from reported literature and submit a report on it.

OR

One mini Theoretical or Fabrication project and submit a report on it.

OR

Attend a course of Entrepreneurship Development Course conducted by the college and submit a report on it.

Notes:

1. Practical training is to be undergone in summer vacation after SE and / or in winter vacation after first term of TE.
2. Report should be typed on A4 size paper and two copies paper bounded are to be prepared, one copy for the candidate, and one for the library.