

FACULTY OF ENGINEERING, UNIVERSITY OF PUNE

MCA 2008 COURSE

STRUCTURE FOR SECOND YEAR

SEMISTER III

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					
		Lect	Pr.	Paper		TW	Oral	Pr	Total
				Int	Ext	Int	Ext	Ext	
610901	Operating Systems	4	--	30	70	--	--	---	100
610902	Databases: Concepts & Systems	4	--	30	70	--	--	---	100
610903	Financial Accounting & Management	4	--	30	70	--	--	---	100
610904	Computer Communications & Networks	4	--	30	70	--	--	---	100
611905	Principles of Multimedia	4	--	30	70	--	--	---	100
610906	Software Laboratory - I	--	4	---	---	50	50	---	100
610907	Database Laboratory	--	4	---	---	50	--	50	100
610908	Seminar*	--	2#	---	---	50	--	--	050
Total of First Term		20	10	150	350	150	50	50	750

*Each student will select a topic in the area of Computer Engg./Technology preferably keeping track with recent technological trends and development. The topic must be selected in consultation with the institute guide. Each student will make a seminar presentation in the term making use of audio/visual aids for a duration of 20 – 25 minutes and submit two copies of the seminar report in a prescribed format provided by the host institution duly signed by the guide and Head of the department. Attendance for all seminars for all students is compulsory. Staff members of the institute will assess the seminar internally.

SEMISTER IV

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					
		Lect.	Pr.	Paper		TW	Oral	Pr	Total
				Int	Ext	Int	Ext	Ext	
610909	Software Engineering	4	--	30	70	--	--	---	100
610910	Web Technology	4	--	30	70	--	--	---	100
610911	Object Oriented Analysis & Design	4	--	30	70	--	--	---	100
610912	Java Programming	4	--	30	70	--	--	---	100
610913	Elective I	4	--	30	70	--	--	---	100
610914	Web Programming Laboratory	--	4	---	---	50	50	---	100
610915	Software Laboratory II	--	4	---	---	50	---	50	100
610916	Mini Project**	--	2#	---	---	50	--	--	050
Total of First Term		20	10	150	350	150	50	50	750

Hours/per/week/Student

** Mini Project is to be carried out in a group of 4 students. Each group will be assigned a guide. At the end of the term the students should submit 2 copies of the report in a prescribed format provided by the institute duly signed by the guide and Head of the Department. Staff members of the institute will assess the mini project internally.

ELECTIVE I

1. HUMAN COMPUTER INTERFACE
2. ORGANIZATION BEHAVIOUR

Guidelines for setting question paper at the Second Year Master in Computer Applications (MCA) 2008 course under faculty of Engineering

- 1) Since the syllabi of all the subjects in this curriculum is unitized in SIX units, equal weight age shall be given to all the units with respect to number of questions and allotted marks
- 2) Each paper shall consists of TWO sections viz. Section A and B. Units I through III shall be under Section A and Units IV through VI shall be under section B.
- 3) Every unit shall carry TWO questions with internal choice/option offered to the candidate as follows

Section A

Unit – I	Q. 1	OR	Q. 2	MARKS 12/11
Unit – II	Q. 3	OR	Q. 4	MARKS 12/11
Unit – III	Q. 5	OR	Q. 6	MARKS 12/11

Section B

Unit – IV	Q. 7	OR	Q. 8	MARKS 12/11
Unit – V	Q. 9	OR	Q. 10	MARKS 12/11
Unit – VI	Q. 11	OR	Q. 12	MARKS 12/11

610901: OPERATING SYSTEMS

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Objectives:

- To understand the concepts and components of Systems Programming
- To Learn and understand the fundamentals of Operating systems

Prerequisites:

- Data Structures

Unit I (8 Hrs)

Introduction: Components of System Software, Language Processing Activities, Fundamentals of Language Processing, Development tools

Assemblers: Elements of assembly language programming, simple assembly scheme, pass structure of assembler, design of two pass assembler, single pass assembler

Macro Processors: Concept and need, Features of MASM (No design aspects for macro preprocessor expected)

Unit II (8 Hrs)

Linkers, Loaders and Compilers: Loader Schemes: Compile and go, General Loader Scheme, Absolute loaders, subroutine linkages, relocating loaders, direct linking loaders, Case study of MS-DOS Linker and Debug

Introduction to compiler: lexical analyzer and parsing, Phases of compiler

Unit III (8 Hrs)

Operating Systems: Introduction, Evolution of OS, Batch Processing Systems, Multi-programming Systems, Time sharing systems, Multitasking systems, Real Time Operating Systems, system components, OS services, OS Structure, System Calls

Process -concept, Process Control, Job schedulers, Job Scheduling, scheduling criteria, scheduling algorithms

Unit IV (8 Hrs)

Memory management: Contiguous and non-contiguous, Swapping, Paging, Segmentation and demand Paging, Virtual Memory, Management of Virtual memory: allocation, fetch and replacement

Unit V (8 Hrs)

File Management: Concept, Access methods, Directory Structure, Protection, File System implementation, Directory Implementation, Allocation methods, Free Space management, efficiency and performance

IO systems: disk structure, disk scheduling, disk management.

Unit VI (8 Hrs)

Case Study of Linux: Structure of LINUX, design principles, kernel, process management and scheduling, file systems

Textbooks

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", 6th Edition, John Wiley and Sons, ISBN 9812 – 53 – 055 – X
2. Dhamdhare D., "Systems Programming and Operating Systems", 2nd Edition, Tata McGraw Hill, 1999, ISBN 0 – 07 – 463579 – 4

Reference Books

1. John J. Donavan, "systems programming" Tata McGraw Hill, ISBN-13: 978-0-07-460482-3.
2. Stallings W., "Operating Systems", 4th Edition, Prentice Hall, 81 – 7808 – 503 – 8
3. Beck L., "System Software: An Introduction to Systems Programming", 3rd Edition, Pearson Education, 1997, ISBN 0-201-43581-0
4. Aho A., Sethi R., Ullman J., "Compilers", Pearson Education, 81 – 7808 – 046 – X

610902: DATABASES: CONCEPTS AND SYSTEMS

Teaching scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Objectives:

- To learn and understand Database System and its components
- To learn SQL and Database Design

Prerequisites:

- Discrete Structures
- Data Structures and Files

Unit I

(08 Hrs)

Introduction to DBMS: Basic concepts, Advantages of a DBMS over file-processing systems, Data abstraction, Database Languages, Data Models and Data Independence, Components of a DBMS and overall structure of a DBMS, Multi-User DBMS Architecture, System Catalogs

Unit II

(08 Hrs)

Data Modeling: Basic Concepts, entity, attributes, relationships, constraints, keys, E-R and EER diagrams: Components of E-R Model, conventions, converting E-R diagram into tables, EER Model components, converting EER diagram into tables, Realization of ER Diagram in UML

Unit III

(08 Hrs)

Relational Model: Basic concepts, Attributes and Domains, Codd's Rules, Relational Integrity: Nulls, Entity, Referential Integrities, Enterprise Constraints, Views, Schema diagram

SQL: Characteristics and advantages, SQL Data Types and Literals, Nulls, DDL, DML

SQL DDL Queries: Tables: Creating, Modifying, Deleting, Views: Creating, Dropping, Indexes

Unit IV

(08 Hrs)

SQL DML Queries: SELECT Query and clauses, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, Nested Queries, Database Modification using SQL Insert, Update and Delete Queries, Updation using Views, concept of Triggers, Embedded SQL, Dynamic SQL, ODBC, SQL Functions: Character, Numeric, Date, Conversion etc.

PL/SQL: Introduction, PL/SQL Basics: Block, Data types, Variables, Expressions, Program flow, Using SQL with PL/SQL: Retrieving Data, Cursors, Built-in SQL functions, creating and using Procedures

Unit V

(08 Hrs)

Relational Database Design: Purpose of Normalization, Data Redundancy and Update Anomalies, Concept of Functional Dependency, The Process of Normalization: 1NF, 2NF, 3NF and BCNF.

Methodology: Introduction to Database design methodology, overview of Database design methodology, Conceptual Database design

Unit VI

(08 Hrs)

Transaction Management: Basic concept of a Transaction, Properties of Transactions, Concept of Schedule, Serial Schedule, Serializability: Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules

Concurrency Control: Need, Locking Methods, Deadlocks, Timestamping Methods, Optimistic Techniques, Multi-Version Concurrency Control,

Recovery System: Different Crash Recovery methods such as Shadow-Paging and Log-Based Recovery: Deferred and Immediate, Checkpoints

Text Books:

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", 4th Edition, McGraw Hill Publishers, 2002, ISBN 0-07-120413-X
2. Connally T., Begg C., "Database Systems", 3rd Edition, Pearson Education, 2002, ISBN 81-7808-861-4

Reference Books:

1. Rab P. Coronel C. "Database Systems Design, Implementation and Management", 5th Edition, Thomson Course Technology, 2002, ISBN 981-243-135-7
2. Elmasri R., Navathe S., "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2003, ISBN 8129702282
3. Date C., "An Introduction to Database Systems", 7th Edition, Pearson Education, 2002, ISBN 81 -7808 - 231- 4
4. Ramkrishna R., Gehrke J., "Database Management Systems", 3rd Edition, McGraw-Hill, 2003, ISBN 0-07-123151-X

610903: FINANCIAL ACCOUNTING & MANAGEMENT

Teaching Scheme:
Lecture: 4 Hrs/Week

Examination Scheme:
Theory: 70 marks

Objective: To impart basic accounting knowledge.

Unit I: Introduction (12Hrs)

Financial Accounting-Definition, Scope and objectives, System of Book Keeping, Terms used in accounting, Accounting Concepts, Principle and Conventions.

Recording of transactions: Maintenance of journals, Subsidiary Books, Ledger, Cash Book and Trial Balance

Preparation of Final Accounts: Preparation of trading And Profit & Loss Accounts And Balance Sheet

Unit II: Tools of financial Management (10Hrs)

Elements of Costs: Material, Labour, overhead, Preparation of cost sheet

Ratio Analysis: Classification of Ratio, Structural group, Turnover group, Limitation of Ratio Analysis, Return on Investment.

Marginal costing: - Cost –Volume-Profile Analysis: Mechanics of break-even Chart. Practical application of marginal costing, Margin of Safety.

Management of cash: motives of holding cash preparation of cash budget.

Unit III: Working Capital Management (6Hrs)

Concepts & needs, Factors affecting working capital requirement, Estimation of working capital requirement, Financing the working capital requirement

Unit IV: Capital Budgeting (8 Hrs)

Importance, process of capital budgeting, evaluation of the project, techniques for evaluation of capital expenditure proposal, limitation of capital budgeting.

Unit V: Cost of Capital (8 Hrs)

Introduction, concepts, Measurement of Cost of Capital, Composite cost of capital

Unit VI: Computerized Accounting: (4 Hrs)

Use of computers in accounting, Study of Tally 9.0-Debit note, Credit note, Purchase order, Sales order and other related terms, Uses & importance of Tally.

Problems should be covered on the following topics:

- I] Journalisation, Ledger, Trial Balance, Final Accounts.
- II] Cost Sheet, Ratio Analysis, Marginal Costing, and Preparation of cash Budget.
- III] Estimation of working capital.
- IV] Problems on capital Budgeting Pay back Period, Discounted pay back period, ARR, NPV, IRR, PI
- V] Cost of Equity Shares, Preference Shares, Debentures.

Text-books:

1. Financial Management : By S. M. Inamdar (Everest Publishing House)
2. Management Accounting : By Dr. Mahesh Kulkarni(Career Publishing House)

References-books:

- 1 Financial Accounting for Management: By Dr. S. N. Maheshwari(Vikas Publishing House).
- 2 Financial Management: By Khan And Jain (Tata McGraw- Hill).
3. Cost & Management Accounting : By S. M. Inamdar (Everest Publishing)
4. Management Accounting : By Khan & Jain (Tata McGraw Hill)
5. Management Accounting: A. P. Rao.

610904: COMPUTER COMMUNICATIONS & NETWORKS

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Objectives:

- To learn and understand fundamentals of computer network
- To learn and understand network architectures, protocols and applications

Unit I (08 Hrs)

Introduction: What is Computer communication? Communication system, Signal and Data, Channel Characteristics, Transmission Modes, Synchronous and asynchronous transmission

Transmission Media: Guided Media – Twisted Pair, Coaxial and Fiber-optic cables, Unguided Media: Radio, VHF, Micro Waves and Satellite
Multi-channel Data Communication: Circuits, channels and multi-channeling, Multiplexing: FDM, TDM, CDM and WDM

Unit II (08 Hrs)

Networking Fundamentals

Switching Techniques: Circuit switching, Packet switching and message switching, Telephone network, Network topologies, LAN, MAN, WAN, Protocols and Standards, OSI Model, TCP/IP Model, Types of Networks: Peer to Peer, Client-Server

Data Link Layer: Design issues: Services, Framing, Error and flow control, Stop-and-Wait protocol, Sliding Window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Data link layer in Internet and ATM

Point-to-Point-Access (PPP): Frame format, Transition states, PPP Stack: LCP, NCP

Network Hardware Components: Connectors, Transceivers and Media Converters, Repeaters, NICs, Bridges and Switches

Unit III (08 Hrs)

Medium Access Control sub-layer: Channel allocation: Static and Dynamic allocation, Multiple Access Protocols: ALOHA, CSMA, Collision-free and limited-contention protocols, WDMA, Wireless LAN Protocols, Ethernet: Cabling, encoding, MAC sub-layer protocol, Switched, fast and Gigabit Ethernet, Logical link control, Wireless LANs and Digital Cellular Radio, Broadband Wireless, Virtual LANs, Bluetooth, Virtual Circuit Switching: Frame Relay and ATM

Unit IV (08 Hrs)

Network Layer: Design Issues, Packet switching, Connectionless and Connection-oriented Services, Virtual Circuit and Datagram Subnets, Routing Algorithms, Internetworking, Firewalls

Congestion Control and QOS: General Principals, Congestion prevention policies, Load shading, Jitter Control, Quality of Service, Internetworking

Network layer Protocols: ARP, IP protocol, IP Addresses, IPV6, ICMP, Unicast Routing Algorithms: RIP, OSPF, BGP, Multicast Routing: IGMP, Mobile IP

Unit V

(08 Hrs)

Transport Layer: Services and service primitives, Sockets, Elements of Transport protocol: Addressing, Connection establishment and release, flow control and buffering, Multiplexing, Crash recovery, Simple Transport Protocol, UDP: Introduction, RPC, TCP: Introduction, Model, protocol, header, connection establishment and release, connection management, Transmission policy, congestion control, timer management, Introduction to wireless TCP and UDP, Performance issues

Unit VI

(08 Hrs)

Application Layer: Domain Name System (DNS) and DNS servers, Electronic Mail: Architecture and services, Message Formats, MIME, message transfer, SMTP, Mail Gateways, Relays, Configuring Mail Servers, File Transfer Protocol, General Model, commands, TFTP

World Wide Web: Introduction, Architectural overview, static and dynamic web pages, WWW pages and Browsing, HTTP

Text Books:

1. Tanenbaum A., "Computer Networks", 4th Edition, PHI, ISBN 81 – 203 – 2175 – 8
2. Fourauzan B., "Data Communications and Networking", 3rd edition, Tata McGraw-Hill Publications, 2004, ISBN 0 – 07 – 058408 – 7

Reference Books:

1. Keshav S., "An Engineering Approach to Computer Networking", Perason Education, ISBN 981 – 235 – 986 – 9
2. Comer D., "Computer Networks and Internet", 2ND Edition, Pearson Education, ISBN 81 – 7808 – 086 – 9
3. Gallo M., Hancock W., "Computer Communications and Networking Technologies", Thomson Brooks/Cole, ISBN 981 – 240 – 354 – X

610905: Principles of Multimedia

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Paper: 70 Marks

Learning Objectives:

- Learn key concepts of Multimedia
- Learn to design Multimedia projects independently

UNIT I: Introduction **8 Hrs**

What is multimedia, goals and objectives, characteristics of multimedia presentation, multimedia application, multimedia building blocks, multimedia and internet.

Multimedia Architecture:

User interface: GTK +, Qt, Windows multimedia support, hardware support, distributed multimedia application, streaming technologies, multimedia database systems, multimedia authoring tools, overview of multimedia software tools, multimedia document architecture (MHEG, SGML, ODA, OMF, etc.)

UNIT II: Image Processing **10 Hrs**

Basic image fundamentals, image data types, image file formats (GIF, BMP, TIFF, JPEG, PCX, etc), Image acquisition, storage processing, communication and display, image enhancement: Enhancement by point processing, spatial filtering, color image processing.

Image compression: Types of compression: Lossy and lossless, symmetrical and asymmetrical, intraframe and interframe Hybrid, Lossless: RLE, Shannon – Fano algorithm, arithmetic coding. Lossy: Vector quantization, fractal compression technique, transform coding, psychoanalysis, interframe correlation. Hybrid: JPEG-DCT

UNIT III: Multimedia Audio **8 Hrs**

Nature of sound waves, characteristics of sound waves, psychoacoustics, elements of audio systems: Microphone, amplifiers, speakers, synthesizer, MIDI, digital audio, CD formats.

Audio File Format: WAV, AIFF, VOC, AVI, AVO, MPEG-I, MPEG-II, MPEG-III, MPEG-IV, RMF, WMA, MFC.

Unit IV: TEXT **8 Hrs**

Types of text, text compression: Huffman coding, LZ and LZW, text file formats: TXT, DOC, RTF, PDF, PS.

Video: Video signal formats, video transmission standards: EDTV, CCER, CIF, SIF, HDTV, Digitization of video, video recording systems: VHS, video compact cassette, DVCAN, Camcorder, laser disk, VCD, DVD-Video, Micro-MV, Video r^ formats: MOV, Real video, H-261, H-263, Cinepack, Nerodigital, Video editing, DVD formats

UNIT V: Virtual Reality and Multimedia **8 Hrs**

Concept, norms of VR, VR application, VR devices: Hand gloves, head mounted tracking systems, VR chair, CCD, VCR, 3D Sound system, head mounted display. Virtual objects-Basics of VRML.

UNIT VI: Animation**8 Hrs**

Uses of animation, types of animation. Principles of animation, techniques of animation: Onion skinning, motion cycling, masking, flip book animation, rotoscoping and blue screening, color cycling, morphing, animation on the web, 3D animation, creating animation.

Text Books:

1. Ranjan Parekh, “Principles of Multimedia”, TMH, ISBN 0-07-058833-3
2. Ralf Steinmetz and Klara Nahrstedt “Multimedia Computing, Communication and Applications” Pearson Education.

Reference:

1. Ze-Nian Li, Marks S. Drew, “Fundamentals of Multimedia” Pearson Education.
2. Nigel Chapman and Jenny Chapman, Wiley “Digital Multimedia”
3. A. K. Jain, “Fundamentals of Digital Image Processing”, PHI
4. Gonzalez, Woods, “Digital Image Processing”, Addison Wesley.
5. Mark Nelson, “Data Compression Book”, BPB.
6. Judith Jeffcoate, “Multimedia in Practice”, PH.

610906: SOFTWARE LABORATORY - I

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
Oral: 50 Marks
Term Work: 50 Marks

OPERATING SYSTEM

Assignments to be framed by the instructor on following topics

1. CPU Scheduling.
2. Memory Management (Page replacement algorithms)
3. Disk scheduling
4. Installation of Linux and study of commands

COMPUTER COMMUNICATION & NETWORK

1. Study of Campus LAN design & testing of LAN using Ping Command.
2. Study networking devices: hubs, switches, modem, routers.
3. Installation and configuration of web server & client.
4. PC to PC Communication using null modem.
5. Implementation of echo server using 'C'

MULTIMEDIA

1. Study of multimedia authoring tools. (Only for Term work)

Students will submit the term work in the form of a journal, which will include at least 12 assignments based on the topics mentioned above with problem statement, implementation and results.

610907: DATABASE LABORATORY

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
Term Work: 50 Marks
Practical: 50 Marks

Suggested list of Assignments

Part I: RDBMS

- 1) Design and draw an ER/EER diagram using standard notations for given problem definition and convert this diagram into Database Tables. (Instructor should define problem definition with reasonable complexity for each batch such that it facilitates the use of all ER/EER features such as all types of relationships, all types of attributes, strong and weak entities, aggregation, generalization etc.) Create Database Tables and Indices in back-end database such as ACCESS/Foxpro etc using GUI/Commands. Insert tuples in each table such that every relationship and constraint is reflected. Perform updates on these tables. Now create tables with ORACLE/ INGRESS/SQL Server/MySQL/PostgreSQL using SQL DDL statements. Use SQL DML statements such as INSERT, UPDATE and DELETE to insert the data into tables and to update/delete the data inserted into/from tables. Write and execute SQL queries to extract information from the tables. (Instructor should frame questions such that the required queries should involve use of string manipulation functions, aggregate functions, Date functions, conversion and transformation functions, simple queries and nested queries, renaming of attributes and/or tables, removal of duplications, creating views etc.)
- 2) Design and develop forms and reports using MS ACCESS or ORACLE D2K.
- 3) Write and execute Embedded SQL queries using C/C++ as host language. The problem definition should allow the use of cursors and all commonly used command and bi-directional transfer of information (Between host language data items and back end Databases).
- 4) Write and execute Dynamic SQL query. (Instructor should frame appropriate problem definition).
- 5) Assignment on PL/SQL to cover its basic aspects.
- 6) Write and execute Triggers and Procedures/ Functions using PL/ SQL. (Instructor should frame appropriate problem definition).
- 7) Create and perform Database operations using ODBC

Part II: Visual Programming:

Write and execute **6-7** assignments in VB to illustrate the use of various features of Visual Basic such as

- **User Interface Design**
Controls and components (Text Boxes, Labels, Option and Command buttons, Check boxes, List boxes and Combo boxes, Shapes, Panels, Menus, Frames, Rich Text boxes, Scroll bars, Grid control, control arrays, Image and Picture boxes, Message boxes, Progress bar, Numeric Up-Down counter, Tab controls, Common Dialog Box etc.)
Properties - Use of important properties (Appearance, Behavior etc) for every control on the form
- **VB Programming** (Data types, variable declarations, control structures, file support)
- **Events** (Click, double click, change, Form Load, Got Focus, Lost Focus, Key pressed etc)
- **Database Programming Using:** VB Data Control, ADO, DAO and OLEDB
- **Overall program development life cycle** (Form design, Control and events, Application, Data Form and Packaging and Deployment Wizards).

Instructor should frame appropriate problem definitions for these assignments

Instructions:

- Instructor should frame assignments based on the assignments as given above. Students should submit Term Work in the form of a journal that should include at least 14 assignments and a mini-project. Each assignment should consist of paper design (Database and/or user interface), write-up, program listing with proper documentation and printout of the output.
- Practical Examination will be based on the term work and questions will be asked to judge understanding of assignments performed at the time of examination.

Reference Books:

- 1) Luers T., Atwood T., Gennick J., "Teach Yourself SQL in 21 Days", Techmedia, ISBN 81 – 7635 – 014 – 1
- 2) Rob P., Semaan E., "Databases: Design, Development and Deployment Using MS-ACCESS", 2001, Tata McGraw-Hill, ISBN 0 – 07 – 044534 – 6
- 3) Urman S., Hardman R., McLAUGHLIN M., "PL/SQL Programming: Develop Database Driven PL/SQL Applications", Tata McGraw-Hill Edition, 2004, ISBN 0 – 07 – 059779 – 0

610908: SEMINAR

Teaching Scheme:

Practical: 2 Hrs/Week/Student

Examination Scheme:

Term Work: 50 Marks

Each student will select a topic in the area of Computer Engg./Technology preferably keeping track with recent technological trends and development. The topic must be selected in consultation with the institute guide. Each student will make a seminar presentation in the term making use of audio/visual aids for duration of 20 – 25 minutes and submit two copies of the seminar report in a prescribed format duly signed by the guide and Head of the department. Attendance for all seminars for all students is compulsory. A panel of staff members of the institute will assess the seminar internally.

610909: SOFTWARE ENGINEERING

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Paper: 70 Marks

Unit I (06 Hrs)

Introduction to Software Engineering: Software, Software Myths, Process Framework, CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Introduction to specialized Process Models, The Unified Process

Unit II (06 Hrs)

Software Engineering Practice: The Essence of Practice, Core Principles, Communication Practices, Planning Practices, Modeling Practices: Analysis and Design Modeling, Construction Practice: Coding and Testing Principles, Deployment System Engineering: **Computer-Based Systems, Hierarchy: System Modeling and Simulation, Business Process Engineering, Product Engineering, System Modeling: Hatley-Pirbhai Modeling and Modeling using UML**

Unit III (06 Hrs)

Requirements Engineering

Requirements Engineering Tasks, Initiating the process, Eliciting Requirements, Developing Use-Cases, Building The Analysis Model: Requirements Analysis, Data Modeling Concepts, Object-Oriented Analysis, Scenario-Based Analysis, Flow-Oriented Modeling, Class-Based Modeling, Creating a Behavioral Model

Unit IV (06 Hrs)

Design Engineering

Design Process and design quality, Design Concepts, The Design Model, Introduction to Pattern-Based Software Design

Architectural Design: Software Architecture, Data Design and Architectural Design User Interface Design: Rules, User Interface Analysis and Steps in Interface Design, Design Evaluation

Unit V (06 Hrs)

Testing Strategies And Tactics: A Strategic approach to Software Testing, Strategic Issues, Testing Strategy for Conventional Software and Object-Oriented Software, Validation Testing, System Testing, Validation and Verification

Testing Tactics: Black Box and White Box Testing, Basis Path Testing, Control Structure Testing, Object-Oriented Software Testing Methods

Unit VI (06 Hrs)

Product Metrics: Software Quality, Framework for Product Metrics, Metrics for Analysis Model, Design Model, Metrics for Source Code, Metrics for Testing and maintenance

Text Books

1. Pressman R., “Software Engineering, A Practitioners Approach”, 6th Edition, Tata McGraw Hill Publication, 2004, ISBN 007 – 124083 – 7

Reference Books:

1. S A Kelkar, “Software Engineering: A Concise Study”, PHI
2. Vliet H., “Software Engineering Principles and Practices”, Second Edition, John Wiley and Sons, ISBN 9971-51-357-9
3. Ghezzi C., Jazayeri M., Mandrioli D., “Fundamentals of Software Engineering”, Second Edition, Prentice Hall India, 2003, ISBN 81-203-2242-6
4. Behfarooz A., Hudson F., “Software Engineering Fundamentals”, Oxford University Press, 2002, ISBN 0-19-510539-7

610910: WEB TECHNOLOGY

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Paper: 70 Marks

Unit-I: Introduction to Web Technologies (8 Hrs)

Brief introduction to WWW, Components of Web Technologies (Web Server, Mail Server, Web Browser etc.), Static and Dynamic Websites, Concept of 2,3 Tier Architecture, Role of Middleware, Application of Web Technologies in E-Commerce, Web Space registration. management and uploading(utilities like FTP, TFTP), Client Browser Configuration.

Unit-II: Introduction to HTML (8 Hrs)

Evolution of Markup Languages, HTML- Introduction to HTML Document Structure, HTML tags (Basic Tags, Formatting Tags, Creating Hyperlink, Images, Frames, Tables and Forms), Cascaded Style Sheets(CSS) and it's applications, using cascaded style sheets with HTML.

Unit-III: DHTML (8 Hrs)

DHTML role and benefits, creating interactive web pages using DHTML, Introduction to Scripting, Server Side and Client Side Scripting, using VB Script in web pages, VB Script variables, statements, procedures, functions.

Unit-IV: Java Scripting (8 Hrs)

Overview of Java Scripting Language, Java Script Data types, Variables, Control Structure, Primitive Operations, Objects etc., Using Java Script for validations, Event Handling, Using java script for input validations.

Unit-IV : Server Side Web Technologies(JSP and AJAX) (8 Hrs)

JSP Architecture, life cycle of JSP, advantages of JSP, Developing Web Pages using JSP, Form Processing in JSP, Introduction to AJAX, Working of AJAX, Application using AJAX.

Unit-VI: ASP.NET (8 Hrs)

Overview of ASP Language, ASP Objects. What is ASP.NET, Overview of .NET Framework, Server Controls and Web Controls, Database Processing and Active-X Control using ASP.NET

References

1. Web Technologies - 2nd Edition, Tata McHill by Achut Godbole
2. CSS - Definitive Guide. By Eric Meyer, Oreilly Publication

610911: OBJECT ORIENTED ANALYSIS & DESIGN

Teaching Scheme:
Lecturers: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Objectives:

- Introduction to Analysis, Modeling and Design of software, firmware and business processes
- Introduce UML 2.0 and its diagrams as a modeling tool for large and complex systems.

UNIT I: (8 Hrs)

Introduction to OMG Standards: MDA, MOF, XMI, CORBA, UML 2.0. UML History, UML 2.0

New Features, Rational Unified Process emphasizing Inception, Elaboration, Construction, Transition Phases, 4+1 View architecture, Architectural approaches: Use case Centric, Architecture driven, Iterative approach, OO Concepts Review

UNIT II: (8 Hrs)

Introduction to UML, UML Meta-Model, Extensibility mechanisms like stereotypes, tagged

Values, constraints and profiles, OCL, Overview of all diagrams in UML 2.0

UNIT III: (8 Hrs)

Object diagrams, CRC method, Review of OO concepts, Class diagrams, Classes and Relationships, Interfaces and ports, Templates, Active Objects, Advanced relationships: Generalization, association, aggregation, dependencies, Composite structure diagrams including

Composite structures, collaborations

UNIT IV: (8 Hrs)

Interaction diagrams. Interaction Overview diagrams including interactions, signals, exceptions,

regions, partitions, Sequence diagrams, Interaction occurrences, combines fragments
Communication diagrams.

UNIT V: (8 Hrs)

State Machine diagrams, States, encapsulation of states, transitions, submachine, state-generalization, Timing diagrams, Activity diagrams, Activities, sub activities, signals, pins, exceptions, partitions, regions

UNIT VI: (8 Hrs)

Support for modeling Architecture in UML. Package diagrams, Component diagrams, Deployment diagrams. Applications of UML in embedded systems, Web applications, commercial applications

All diagrams are to be assumed for UML 2.0. For each diagram the need, purpose, Concepts, Notation, Forward Engineering, Reverse Engineering & Application must be considered.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson “Unified Modeling Language User Guide”, The (2nd Edition) (Addison-Wesley Object Technology Series) (Hardcover)
2. Hans-Erik Eriksson, Magnus Penker, Brion Lyons, David Fado “UML 2 TOOLKIT” OMG Press.

Reference Books:

1. Joseph Schmuller, “SAMS Teach yourself UML in 24 Hours”, Third edition.
2. Martin Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, Third Edition (Paperback) , Addison Wesley
3. Dan Pilone, Neil Pitman, “UML 2.0 in a Nutshell”, (In a Nutshell (O'Reilly)) Paperback)
4. Jim Arlow, Ila Neustadt, “UML 2 and the Unified Process : Practical Object-Oriented Analysis and Design” (2nd Edition) (Addison-Wesley Object Technology Series)
5. Michael Jesse, James A. Schardt, “UML 2.0 for dummies”
6. Kendal Scott, Apress, “Fast track UML 2.0”

610912: JAVA Programming

Teaching Scheme:
Lecturers: 4 Hrs/Week

Examination Scheme:
Theory: 70 Marks

Unit 1: Core Java Basics (8 Hrs)

Java Basics – Java Programming Environment (JVM), Command line tools, Data Types, Classes, Objects, Packages, Interfaces, Collection classes like arrays, vectors, date, etc. Java inheritance, exception handling, threads and multi threading.

Unit 2: AWT & Swing (8 Hrs)

AWT, Components and graphics, containers (frames, windows, panels.) Layout managers, event handling model, swing libraries and components.

Unit 3: Applets (8 Hrs)

Applet basics, applet class methods, HTML tags and parameter passing to applets, using multimedia (images/sound/video) in applets, using applets for animations.

Unit 4: Streams and files (8 Hrs)

Text and binary file formats, Reader- Writer classes, Inputstream- Outputstream classes, Stream Tokenizer, Class, Random access files, print and error streams, object serialization.

Unit 5: JDBC Concepts (8 Hrs)

JDBC Introduction & concepts, JDBC configuration, executing DDL & DML, queries on databases like MS-Access, Oracle, obtaining meta data, transaction management, (commits, rollbacks, save points, batch updates.)

Unit 6: Java Networking (8 Hrs)

Networking in Java, concept of URL, internet addressing using URL, Network exceptions, TCP-IP client server model, sockets.

Reference Books:

1. Java2 Complete reference by H. Schieldt. Tata Mc Hill.
2. Programming with Java: By C. Muthu-2nd Edition. Tata Mc Hill.
3. Programming with Java – By - a primer by E. Balguruswami Tata Mc Hill.
4. Thinking in Java : By Bruce Eckel – 4th Edition Pearson Education.

610913: ELECTIVE I: HUMAN COMPUTER INTERFACE

Teaching: Scheme:
Lectures: 4 Hrs./week

Examination Scheme:
Theory: 70 Marks

Unit I: Introduction: (08 Hrs)

The Human –I/P, O/P channels, Human Memory, thinking, emotion, individual difference (diversity), human psychology.

The Computer: Introduction to I/P, O/P devices

The User: Role of user information system, User characteristic, Needs

The Interface: Goals of user interaction Design, Importance of human factors & motivation, paradigms for interaction.

Unit II: Principles of models and Guidelines: (08 Hrs)

Principle 1: Recognize diversity

Principle 2: 8 golden rules of id

Principle 3: prevent errors

Guidelines for data display, guidelines for data entry, Study of HCL patterns

Models: Types of models, cognitive models, GOMS & keystroke –level model, stages of action model, Linguistic models, BNF & task action grammar, and object action interface model.

Unit III: Design Process: (08 Hrs)

What is design process? , Design process, user focus, aims of user, center design process, three pillars of design, participatory design, scenarios, navigation design, screen design, development methodologies (LUCID)

S/W tools: Design tools & S/W engineering Tools.

Unit IV: Design 2: direct manipulation system: (08 Hrs)

Visual thinking & locus, virtual environment, menu organization, item representation sequence, menu layout, form filling dialog boxes, dialog design notations

Usability: Introduction, usability, testing & evaluation techniques, expert review, acceptance test.

Implementation support: (08 Hrs)

Support, training & learning, requirement of user support, element of windowing systems, Individual window design, multiple window design, command organization strategies command menus, natural languages in computer

Unit V: Documentation and social issues: (08 Hrs)

Documentation: CSCW & Web: presentation style-error messages, printed manuals, and online facilities

CSCW: Groupware, goals of co-operation, Asynchronous interactions, application to education & social issues

Hypermedia: User & their task, O-AI model for Web-site designing.

Unit VI: Miscellaneous**(08 Hrs)**

Case studies, web, embedded, information visualization, interactive devices, social acceptability & Organizational change.

Text Books

1. Designing the User Interface, Ben Shneiderman, Pearson Education, 2001.
2. Human-Computer Interaction, Alan J. Dix, Janet E. Finlay, and Resell Beale, Pearson education, 3rd edition, 2004.

Reference Books:

1. Andy smith, " Human Computer Factors:" A study of user & information system, McGraw hill, 1997
2. Alan Coopen, "The essentials of interaction"

610913: ELECTIVE – I: ORGANIZATION BEHAVIOR

Teaching Scheme:

Lectures: 4 Hrs/week

Examination Scheme:

Theory: 70 Marks

Unit I Organization Behavior

(8 Hrs)

The discipline of Organizational Behavior: Definition - importance of its study in the work situation - different models of organizational behavior i.e. autocratic, custodial, supportive, collegial and SOBC.

Managing self-competency, communication competency, Perception and Attribution - perception process, selection organization, attributions, Motivation Process, content and process models of motivation, motivating performance, goal setting and reward systems.

Unit II Individual

(8 Hrs)

Motivation process - different types of motives - interpersonal conflict frustration and defense mechanism - study of select theories of work motivation Douglas McGregor's theory 'X' and 'Y' - Abraham Maslow's theory of need hierarchy - Fredrick Herzberg's two factor theory of motivation – Vector Vroom's expectancy theory of motivation - morale - relationship of morale to, productivity - measurement of morale. Stress Management - concept of stress-sources of stress-ill-effects of stress on humans - management of stress.

Unit III Group and Impersonal Processes

(8 Hrs)

Group and team behavior, development, team effectiveness, decision-making, power and behavior, Managing human resources, human resource planning, hiring and training, Performance appraisal, Conflict management, levels of conflict, conflict handling and management

Unit IV: Organization

(8 Hrs)

Organizational design - various organizational structures and their effects on human behaviour - organizational climate - organizational culture

Leadership: - Definition - its importance to the organization - leadership style approaches to the study of leadership - trait, behavioral and situational approaches - Fiedler's contingency model - Hersey and Blanchard's Theory, Black and Moutan's Theory, Path and Goal Theory.

Unit V: Management of change

(8 Hrs)

Forces responsible for change - resistance to change overcoming resistance to change - introduction of change in the organization – Organization development - organizational effectiveness

Conflict Management :Traditional vis-à-vis modern view of conflict - constructive conflict - conflict process - strategies for conflict resolution

Unit VI : The Emerging Organization

Total Quality Management - techniques of TQM, Re-engineering-empowerment, bench marking - downsizing – learning organizations"

Books

- 1) Organizational Behavior: Stephen Robbins, Prentice Hall of India.

610914: WEB PROGRAMMING LABORATORY

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
Term Work: 50 Marks
Oral: 50 Marks

Note:

For assignment below (no 1 to no 7) Study, installation and configuration of web browsers, web servers is expected.

Assignment 1

Designing a simple website using HTML/DHTML using basic text formatting, images, lists, tables, frames and forms, e.g. Resume Creation/ Shopping Applications/ Help files generation

Assignment 2

Creating simple web page for acceptance of data such as name, emails, contact no, URLs etc. and doing data processing, validation using VB Script

Assignment 3

Java Script Event Handling Implementation, e.g.

- a. key events
- b. mouse events
- c. load/ unload/ reset/ submit form events

Assignment 4

Animation of text/ images/ sounds/ videos etc. using Java Script

Assignment 5

JSP: - Using JSP in Web pages. (Implementation of JSP for applications like data form processing)

Assignment 6

ASP.NET:- Creating a simple ASP.NET application to demonstrate use of ActiveX controls / .NET Framework.

Assignment 7

AJAX Implementation: (for example sending an XMLHttpRequest to retrieve data when the user clicks a button, sending an XMLHttpRequest to retrieve HTML header data.)

OOMD Assignments

Frame at least 4 assignments based on case study, to draw all 13 UML diagrams using any UML tool.

Example case studies

- 1) Implementation of Library management system.
- 2) Implementation of Hospital management system.
- 3) Online Reservation System.
- 4) College Admission Process.

Students will submit the term work in the form of a journal, which will include at least 12 assignments based on the topics mentioned above.

610915: SOFTWARE LABORATORY - II

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
Practical: 50 Marks
Term Work: 50 Marks

Assignment 1: Getting acquainted with Java Environment.

(Students will know use of java interpreter, compiler, class-paths etc.)

Formulate any 2 problem statements e.g.

Managing student/collage/supermarket information to demonstrate use of

1. Java Classes.
2. Java Packages
3. Java Interfaces
4. Exception handling

Assignment 2: Implementation of multithreading.

A] Using matrix manipulation / sorting technique.

B] Creating digital clock.

To demonstrate concepts like

1. Thread creation
2. Thread communication.
3. Thread prioritization.

Assignment 3: AWT Implementation.

A] Creation of calculator.

B] Create GUS for information management & processing (e.g. personal data, admission- process etc.)

Assignment 4: Applet Handling

A] Implement any problem (e.g. font settings / text formatting) using applets & HTML file for parameter passing.

B] Animation using images / sound / videos.

Assignment 5: File Handling.

A] Command based accepting file name, data from user, doing data updation, deletion, insertion into files.

B] AWT Based – From GUI, accepting data, displaying data, processing data.

Assignment 6: JDBC & Networking.

A] Create a database (e.g. collage / student / shop) Execute DDL/DML queries on it.

B] Implement either of following.

- 1] Socket programming
- 2] Java usage for Internet connection.

Note: Use of Application development Tools such as Eclipse, KAWA, J Creator/VJ ++, Coffee cup etc. is recommended.

Students will submit the term work in the form of a journal, which will include at least 12 assignments based on the topics mentioned above. Practical examination will be based on the term work and questions will be asked to judge understanding of assignments performed at the time of examination.

610916: MINI PROJECT

Teaching Scheme:
Practical: 2 Hrs/Week/Student

Examination Scheme:
Term Work: 50 Marks

Mini Project is to be carried out in a group of 4 students. Each group will be assigned a guide. At the end of the term the students should submit 2 copies of the project report in a prescribed format provided by the institute. A panel of staff members of the institute will assess the mini project internally.