MCA 2005 (Under Faculty of Engineering) Course

Resolution by BOS in Computer Engineering for changing the ATKT (Rule no. 5 (a) and 5 (b) page 58 and 59) Rules

Existing Rules for ATKT
Rule 5a
- A student shall be allowed to keep term for the S. Y. course if he/ she has a backlog of not more than 3 Heads of passing in Theory Examination and not more than 2 Heads of passing in practical Examination and or oral examination OR backlog of not more than 3 Heads of passing in practical and or oral and 2 Heads of passing in theory examination at F.Y. examination.

Rule 5b
- A student shall be allowed to keep term for the T.Y. course if he/she has no backlog of F.Y. and. if he/ she has a backlog of not more than 3 Heads of passing in Theory Examination and not more than 2 Heads of passing in practical Examination and or oral examination OR backlog of not more than 3 Heads of passing in practical and or oral and 2 Heads of passing in theory examination at S.Y. examination.

The changed rules are as follows
Changed Rule 5a
- A student shall be allowed to keep term for the S. Y. course if he/ she has a backlog of not more than 5 Heads of passing in Theory Examination and not more than 3 Heads of passing in practical Examination and or oral examination OR backlog of not more than 5 Heads of passing in practical and or oral and 3 Heads of passing in theory examination at F.Y. examination.

Changed Rule 5b
- A student shall be allowed to keep term for the T.Y. course if he/she has no backlog of F.Y. and. if he/ she has a backlog of not more than 5 Heads of passing in Theory Examination and not more than 3 Heads of passing in practical Examination and or oral examination OR backlog of not more than 5 Heads of passing in practical and or oral and 3 Heads of passing in theory examination at S.Y. examination.

Resolved and recommended to the FOE that the changes in ATKT rules as mentioned above may be approved.

Prof. G V Garje
Chairman BOS in Comp Engg
University of Pune

University of Pune
Second Year Master of Computer Applications (MCA)
Under Faculty of Engineering Course

Semester I

Subject Code	Subject	Teaching Scheme		Examination Scheme				Marks
		Lect.	Pract	Th	Tw	Pr	Or	
215001	Operating Systems	03	—	100	—	—	—	100
215002	Database Management Systems	03	—	100	—	—	—	100
215003	Financial Accounting	03	—	100	—	—	—	100
215004	Data Communications & Computer Networks	03	—	100	—	—	—	100
215005	Principles of Multimedia	03	—	100	—	—	—	100
215006	Computer Networks Laboratory	—	04	—	—	—	50	50
215007	RDBMS & Visual Programming Laboratory	02	04	—	25	50	—	75
215008	Operating Systems Laboratory	—	04	—	25	50	—	75
	Total	**17**	**12**	**500**	**50**	**100**	**50**	**700**

Semester II

Subject Code	Subject	Teaching Scheme		Examination Scheme				Marks
		Lect.	Pract	Th	Tw	Pr	Or	
215009	Software Engineering I	03	—	100	—	—	—	100
215010	Web Technology	03	—	100	—	—	—	100
215011	Object Oriented Modeling & Design	03	—	100	—	—	—	100
215012	Organization Behavior	03	—	100	—	—	—	100
215013	Java Programming	03	—	100	—	—	—	100
215014	Web Programming Laboratory	—	04	—	50	50	—	100
215015	Software Laboratory	—	04	—	50	50	—	100
215016	Software Development Tools Laboratory	02	04	—	50	50	—	100
	Total	**17**	**12**	**500**	**150**	**150**	—	**800**

Th: Theory   Tw: Term Work   Pr: Practical Or: Oral

215001: OPERATING SYSTEMS

Teaching Scheme: **Examination Scheme:**
Lectures: 3 Hrs/Week   Theory: 100 Marks

Objectives:

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

Prerequisites:
- Data Structures
- Microprocessors

Unit I   **(8 Hrs)**
Introduction: Components of System Software, Language Processing Activities, Fundamentals of Language Processing, Development tools
Assemblers: Structure of an assembler, Data structures used, organization of Single Pass Assembler, Cross Assembler
Macro Processors: Concept and need, Features of MASM (No design aspects for assembler 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 Compilers: Organization, types, introduction of lexical analysis and parsing

Unit III   **(8 Hrs)**
Operating Systems: Introduction, Evolution of OS, Functions of an OS, Batch Processing Systems, Multi-programming Systems, Time sharing systems, Multitasking systems, Real Time Operating Systems, OS Structure, System Calls, Process, Process Control and Process Scheduling (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)**
I/O Management: I/O programming, I/O organization, I/O scheduling algorithms, I/O buffering
File Management: Concept, Access methods, Directory Structure, Protection, File System implementation, Directory Implementation, Allocation methods, Free Space management, efficiency and performance

Unit VI   **(8 Hrs)**
Case Study of Linux: Structure of Linux, Linux Kernel, system calls, process control and scheduling, structure of File system

Textbooks

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

Reference Books

1. Stallings W., "Operating Systems", 4th Edition, Prentice Hall, 81 – 7808 – 503 – 8
2. Beck L., "System Software: An Introduction to Systems Programming", 3rd Edition, Pearson Education, 1997, ISBN 0-201-43581-0
3. Aho A., Sethi R., Ullman J., "Compilers", Pearson Education, 81 – 7808 – 046 – X
4. Petzold C., "Programming Windows", 5th Edition, Microsoft Press, 81–7853– 007– 4

215002: DATABASE MANAGEMENT SYSTEMS

Teaching scheme:
Lectures: 3 Hrs/Week

Examination Scheme:
Theory: 100 Marks

Objectives:
- To learn and understand Database System and its components
- To learn and understand various Database Architectures and Applications

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

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.

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

215003 FINANCIAL ACCOUNTING

Teaching Scheme: **Examination Scheme:**
Lecture: 3 Hrs/Week   Theory : 100 marks

Unit I: Introduction:
Double entry accounting system, concepts and conventions in accounting, accounting process
Journalization: Rules for journalization, posting in a ledger, trail balance, bank reconciliation statement
Final Accounts: Preparation of Trading and Profit and Loss Account, Balance Sheet

Unit II: Tools of Financial Management:
Funds Flow Analysis: Concepts, Objectives, Techniques of Funds Flow Statement.
Ratio Analysis: Classification of Ratio, Structural group, Turnover group, Standards for Comparison, Limitation of Ratio Analysis, Return on Investment an Integral Ratio.
Cost –Volume-Profile Analysis: Mechanics of break-even Chart. Profit planning & break-even analysis, Margin of Safety
Operating & Financial Leverage: Effects of Leverages on Variability of Earnings , Leverage & Financial Management.

Unit III: Financial Forecasting & Cash Management:
Financial Forecasting: Tools, Pro-Forma Financial statement, Cash budget, Reconciliation of pro-forma financial statement & cash budget
Managing Cash: Inflow & outflow, investing surplus cash

Unit IV: Management of short Term Finance:
Working Capital Management, Accounts Receivable, Inventory, Banks & working Capital Management of Term Loans: Raising the Loans, Term Loan Appraisal, Security, Effective Negotiations.

Unit V: Allocation of Resources:
Capital Budgeting: Control of Capital Expenditure, Evaluation Process-Payback approach, Accounting of Rate of Return , Present Value Method Vs Internal Rate of Return.

Unit VI: Cost of Capital:
Relevant Cost, Measurement of Cost of Capital, Cost of Debt, Preference Shares, Equity Shares Internal Financing, Dividends, Cost of Retained Earnings Concept

Books

1. Management Accounting – A P Rao
2. Cost and management Accounting – Inamdar

215004: DATA COMMUNICATIONS & COMPUTER NETWORKS

Teaching Scheme: **Examination Scheme:**
Lectures: 3 Hrs/Week   Theory: 100 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 a 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
Multichannel Data Communication: Circuits, channels and multichanneling, 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, Collusion-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

Teaching Scheme:
Lectures: 4 Hrs/Week

Examination Scheme:
Theory: 100 Marks

Learning Objectives:
- Learn key concepts of Multimedia
- Learn to design Multimedia projects independently

UNIT I   (08 Hrs)
Introduction
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   (10 Hrs)
Image Processing
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   (08 Hrs)
Multimedia Audio
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   (08 Hrs)
TEXT : 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   **(08 Hrs)**
Virtual Reality and Multimedia
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   **(08 Hrs)**
Animation
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.

215006: COMPUTER NETWORKS LABORATORY

Teaching Scheme: **Examination Scheme:**
Practical: 4 Hrs/Week   Oral: 50 Marks

Assignments:

1. Study of existing LAN & testing of a LAN using Ping Command.
2. Study of crimping.
3. Study networking devices: hubs, switches, modem, routers
4. Installation of Windows 2003 server and its associated domain operations, DHCP, to add users and computers to a domain
5. Using network commands in Linux
6. Installation and configuration of IIS /Apache server. Study and use various facilities/commands and features
7. Study of wireless LAN
8. Implementation of a "Quote of the Day" Server using VB and WinSock Control.

215007: RDBMS AND VISUAL PROGRAMMING LABORATORY

Teaching Scheme: **Examination Scheme:**
Theory: 2 Hrs/Week   Term Work: 25 Marks
Practical: 4 Hrs/Week   Practical: 50 Marks

OBJECTIVES:
- To learn and understand SQL, PL/SQL, Dynamic SQL and Embedded SQL
- To learn and understand Visual programming paradigm using Visual Basic

Instructor should conduct classroom lectures and demonstrations to cover following topics

Visual Programming
- Concept of event-driven programming
- Program development life cycle using VB
- VB Integrated Development environment, Options
- Introduction to VB Forms, Controls, properties, events, Menus
- Introduction to VB Programming, Built-in Functions: Date, String, Financial etc, Program Debugging
- Popup Menus, Toolbars, CoolBars, StatusBars, MaskEdit, ImageCombo, Disk Files, Resource Files, Shell, AppActivate, SendKeys Functions
- Database Access using VB (Data Control, ADO, DAO, OLEDB, ODBC)
- VB Wizards: Application Wizard, Data Form Wizard
-

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 <u>at least 14</u> assignments (with minimum of 7 assignments based on RDBMS and Visual Programming each with at least 2 assignments based on COBOL) 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
4) Reese G., Yarger R., King T., Williums H., "Managing and Using MySQL", 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., ISBN 81 – 7366 – 465 – X
5) Norton P., Groh M., "Guide to Visual Basis 6", 1st Edition, Techmedia Publication, 1998, ISBN 81-7635-145-8
6) Stern N., Stern R., "Structured COBOL Programming", 7th Edition, John Wiley & Sons, ISBN 9971 – 51 – 150 – 9
7) Sunderraman R., "Oracle 9i programming – a Primer", Pearson Education, ISBN 81-297-0362-9
8) Rosenzweig B., Silvestrova E., "Oracle PL/SQL by Example", 3rd Edition, Pearson Education ISBN 81-297-0503-6

215008: OPERATING SYSTEMS LABORATORY

Teaching Scheme: **Examination Scheme:**
Practical: 4 Hrs/Week   Practical: 50 Marks
                                                         Term Work: 25 Marks

1. Shell Programming

2. AWK Programming.

3. Process and Communication.

4. CPU Scheduling.

5. Demand Paging, memory management.

6. Inter-process Communication

Staff In charge should suitably frame minimum six assignments on the above topics. Students will submit the term work in the form of a journal, which will include assignments with problem statement. Implementation and result, practical examination will be based on the term work.

215009: SOFTWARE ENGINEERING I

Teaching Scheme: **Examination Scheme:**
Lectures: 3 Hrs/Week   Theory: 100 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 Principals, 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. Mall R., "Fundamentals of Software Engineering", Second Edition, Prentice Hall India, 2004, ISBN 81-203-2445-5
2. Vliet H., "Software Engineering Princilpes 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

215010: WEB TECHNOLOGY

Teaching Scheme: **Examination Scheme:**
Lectures: 3 Hrs/ Weeks   Paper: 100 Marks

UNIT 1: INTRODUCTION
A brief introduction to Internet, WWW, Web Browser, Web Server, Uniform Resource Locater, Repeators, Bridges, Routers, Gateways, Internet Topology, HTTP, TCP/IP, IP, ARP, RARP, ICMP, Web pages: types and issues, concept of Tier, Frames, Forms, Plugins.

UNIT 2: HTML AND DHTML
Origin and Evolution of HTML, Basic Syntax, Standard, HTML Document Structure, Basic text Formatting, Images, Hypertext Links, Lists, Tables, Frames, Forms, DHTML.

UNIT 3: JAVASCRIPT
Qverview, Object Orientation and Java Script, General Syntactic Characterestic, Primitive Operations and Expressions, Control Statements, Constuctors, Functions, Pattern Matching.

UNIT 4: JAVASCRIPT AND HTML DOCUMENT
The JAVA script Execution Environment, The Document Object Model, Element Accession JAVA script, Event Handling, Dynamic Documents with JAVA script.

UNIT 5: INTRODUCTION TO WEB SERVER AND SERVELETS
WEB Server Operation, General Server Characteristics, Overview Of Serve lets, Serve lets Details, JAVA Serve lets, Serve lets API, Serve Lifecycle, HTML Aware Serve lets, HTML Specific Serve lets,

UNIT 6: JAVA AND INTERNET
Networking in JAVA, Sockets, Sockets Servers, The JAVA .nio package: Buffers and channels, proxy Servers, Internet addressing.

BOOKS:

- Achyut Godbole, Atul Kahate ,"Web Technology ",Tata Mc Grew Hill –ISBM 0-07-0472 98-X
- Programming World Wide Web: Robert W Sebesta Pearson Education ISBN-81-297-0439-0

215011: OBJECT ORIENTED ANALYSIS, MODELING & DESIGN

Teaching Scheme: **Examination Scheme:**
Lecturers: 3 Hrs/Week   Theory: 100 Marks

Objectives:
- Introduction to 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.
- Understand the concepts being modeled in UML

UNIT I:
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:
Introduction to UML, UML MetaModel, Extensibility mechanisms like stereotypes, tagged
values, constraints and profiles. OCL.Overview of all diagrams in UML 2.0

UNIT III:
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:
Interaction diagrams. Interaction Overview diagrams including interactions, signals, exceptions,
regions, partitions, Sequence diagrams, Communication diagrams.

UNIT V:
State Machine diagrams, States, encapsulation of states, transitions, submachine, state
generalization. Timing diagrams, Activity diagrams, Activities, sub activities, signals, exceptions,
partitions, regions

UNIT VI:
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)

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) ,Addision Wesley
3. Dan Pilone, Neil Pitman "UML 2.0 in a Nutshell", (In a Nutshell (O'Reilly)) Paperback)
4. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado "UML 2 Toolkit (Paperback) "
5. Jim Arlow, Ila Neustadt "UML 2 and the Unified Process : Practical Object-Oriented Analysis and Design" (2nd Edition) (Addison-Wesley Object Technology Series) (Paperback)
6. Michael Jesse, James A. Schardt "UML 2.0 for dummies "
7. Kendal Scott, Apress "Fast track UML 2.0 "

215012: ORGANIZATION BEHAVIOR

Teaching Scheme:
Lectures: 3 Hrs/week

Examination Scheme:
Theory: 100 Marks

Unit 1. Organization Behavior
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 2. Individual
Motivation process - different types of motives - interpersonal conflict frustration and defence 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 3. Group *and* Impersonal Processes
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 4. Organization
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 5. Management of change
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-a-vis modern view of conflict - constructive conflict - conflict process - strategies for conflict resolution.

Unit 6. The Emerging Organization –
Total Quality Management - techniques of TQM
Re-engineering-empowerment, bench marking-downsizing–learning organizations".

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

215013: Java Programming

Teaching Scheme: **Examination Scheme:**
Lectures: 4 Hrs/week   Theory: 100 Marks

Unit I: Advanced Java
Review of core java concepts, Moving beyond arrays, Java Structures-Iterator, bit sets, vectors, looping through data structures, stack, Map, and Hash tables, generics

Unit II: AWT and Swing
The Abstract Windows Toolkit (AWT), components and graphics, containers, frames and panels, Layout Managers, event hierarchy, semantic and low level events in AWT, actions, Multicasting, the event queue, Swing Libraries

Unit III: Applets:
Applet basics, Applets specific methods, creating an applet, The Applet HTML tags and attributes, obtaining Multimedia files, Interapplet communication, JAR files

Unit IV: Streams and files
Stream, the complete stream zoo, Zip file streams, putting streams to use, object streams, file management

Unit V: Java and Database
JDBC, JDBC versus ODBC and other API's, Types of JDBC drivers, Two-tier and Three- tier Models, Data types in JDBC, handling database Queries.

Unit VI Networking with Java
Sockets, ports, proxy servers, implementing TCP/IP Client-Server

Text Book

1. Java 6 by Rogers Cadenhead, Laura Lemay, Pearson education ISBN 81-317-1436-5.
2. Core Java Volume 1 Cay S. Horstmann, Gary Cornell Pearson education Asia ISBN 81-7808-277-2

References

1. Java 6 Programming black books Kogent solutions published by dreamtech press edition 2007
2. Thinking in Java, Third edition, Bruce Eckel Pearson education ISBN 82-297-0524-9

215014: WEB PROGRAMMING LABORATORY

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
Term Work: 50
Practical: 50 Marks

1. Design a web site using HTML and DHTML. Use Basic text Formatting, Images, Hypertext Links, Lists, Tables, Frames, Forms.
2. Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page
3. Select some pages you've been working on that you think would benefit from additional description of your links. Update all of the links with an `onMouseOver` event handler that describes the link when the reader passes the cursor over the link. You may also want to add an `onMouseLeave` event handler for each link.
4. Find two images of the same size (or similar sizes) and place one on the page. Then, update your code so that the image changes when the reader moves the cursor over the image.
5. Write a JavaScript program, embedded in an HTML web page, to play Tic-Tac-Toe.
6. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page.
7. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
8. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
9. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work
10. Install Tomcat and use JSP and link it with any of the assignments above
11. Write a Java client and server chat program using socket programming

215015: SOFTWARE LABORATORY

Teaching Scheme: **Examination Scheme:**

Practical: 4 Hrs/Week   Practical: 50 Marks

                                                          Term Work: 50 Marks

Assignments:

1. Write a Java Program for
       Three classes as
       1) Student's personal info (name, address, phone, birth date etc)
       2) Student's academic info (X^{th} , XIIth and B.E.)
       3) Student's other info (project done, seminar, hobbies, sports
          Record etc) Use multiple inheritance and print bio-data of particular student.
          a) Use array of objects for storing
          b) Use vector to store objects
             Use Exception handling wherever required.

2. Write a Java Program to implement stack or queue for an object

3. There are several objects each with two integer data items x and y. The objects can be created by giving values for both the x and y attributes or for none of them or for one of them. The objects can be manipulated by
       i) Adding some fix constant to both x and y
       ii) Adding constant c1 to x and c2 to y . it is possible that both
           C1 and c2 or none of them are provided.
       iii) Add constant as given in i or ii and return new object with updated values.
       iv) Add constants as in i or ii and then   add x of one object to x of other and y of one object to y of other object and return   new object.

4. Displaying an animated clock showing day, date and time using threads in Java

5. Use Java Multi-threading for Merge Sort.

6. Design Java Applets for
   1. List of shape (Triangle, square, rectangle, circle etc) is given by selecting shape draw shape, calculate area & perimeter (use polymorphism) & fill it with selected color.
   2. Bubble sort
   3. Memory management simulation
   4. Change color of background or text box according to list of color or pallet
   5. Moving Banner with message (with threads)
   6. Design a class "Date "with Day, Month and Year as data members.
      Write functions to add & find difference. Use constructor, function overloading for adding two objects, adding one object & constant etc. Accept birth date and display the age using system date

7. Write a simple Applet to illustrate event handling with interactive radio buttons to control Font style of a text field. Also provide a text box wherein the user may enter font size, Blink text.

8. Draw different shapes using menu & select color for shape using list of color or pallet

7. File Handling
Write a Java program for

a) Text file:-
1) Copy one file to another
2) Rename one file to another
3) Type (display) contents of file (use proper formatting functions)
   like providing line nos., use uppercase for output
   (use format flags, manipulators)
4) Count number of lines, words, characters in a file.
5) Search occurrences of a particular word in a file.

b) Data File -
File operations (Sequential/ random access)
(such as student database, payroll , reservation system)
1) create file
2) append record
3) modify record
4) display particular record

215016: SOFTWARE DEVELOPMENT TOOLS LABORATORY

Teaching Scheme:
Practical: 4 Hrs/Week

Examination Scheme:
TermWork:50Marks
Practical : 50 Marks

Assignments:
1. Choose a hypothetical system of significant complexity and write an SRS for the same.
2. Draw one or more Use Case diagrams for capturing and representing requirements of the system. Use case diagrams must include template showing description and steps of the Use Case for various scenarios.
3. Draw one or more Package diagram to organize and manage your large and complex systems as well as their complex models.
4. Draw activity diagrams to display either business flows or like flow charts.
5. Draw basic class diagrams to identify and describe key concepts like classes, types in your system and their relationships.
6. Draw advanced class diagrams to depict advanced relationships, other classifiers like interfaces.
7. Draw sequence diagrams OR communication diagrams with advanced notation for your system to show objects and their message exchanges.
8. Draw state machine to model the behavior of a single object, specifying the sequence of events that an object goes through during its lifetime in response to events.
9. Draw component diagrams assuming that you will build your system reusing existing components along with a few new ones.
10. Draw deployment diagrams to model the runtime architecture of your system.

The teachers will help students choose a hypothetical system preferably either a commercial, web based or embedded system for modeling. The students will try and identify scope of such a system as realistically as possible. Students will learn to draw, discuss different UML 2.0 diagrams, their concepts, notation, advanced notation, forward and reverse engineering aspects. As far as possible draw as many diagrams for one single system, unless they are not applicable for the chosen system in which case other systems may be chosen for specific diagrams.

Any 8 diagrams can be drawn using tool, the other diagrams can be drawn on paper. Optionally one may draw Interaction overview diagrams, timing diagrams, and composite structure diagrams, object diagrams for your system as study assignments, paper based assignment or in cases relevant even in CASE TOOL.

The write-ups for any diagram can include small examples to cover notation that has not been referred to in your submitted diagram. Generally any UML diagram has accompanied document to explain the diagram further for example use case descriptions, non-functional requirements, scripts, notes, assumptions, project management aspects.