

SHIVAJI UNIVERSITY, KOLHAPUR
REVISED STRUCTURE & SYLLABII OF MCA
(w.e.f. 2009-2010.)

SYMCA PART – I

Code of the subject	Name of the subject	L	T	P	TH	TW	P/O	TOTAL
3SMCAR1	Computer Algorithm	4			100			100
3SMCAR2	Operating System-I	4			100			100
3SMCAR3	Relational Database Management System	4		2	100	25	50	175
3SMCAR4	Computer Network	4		2	100	25		125
3SMCAR5	Theoretical Computer Science	4			100			100
3SMCAR6	Programming Laboratory-III		2	4		25	50	75
3SMCAR7	Seminar - III		2			25		25
		20	4	8	500	100	100	700
					Total Load: 32		Total Marks: 700	

SYMCA PART – II

Code of the subject	Name of the subject	L	T	P	TH	TW	P/O	TOTAL
4SMCAR1	Management Information System	4			100			100
4SMCAR2	Object Oriented Modeling & Design	4		2	100	25		125
4SMCAR3	Computer Graphics	4			100			100
4SMCAR4	Operating System Design	4			100			100
4SMCAR5	Software Testing	4		2	100	25	25	150
4SMCAR6	Programming Laboratory-IV		2	4		25	50	75
4SMCAR7	Mini-Project		2				50	50
		20	4	8	500	75	125	700
					Total Load: 32		Total Marks: 700	

3SMCAR1 - COMPUTER ALGORITHM

Theory:4 Hours Per Week Theory:100 Marks

Section – I

1. Introduction- Algorithm specifications, performance analysis, randomize algorithm, Data structures like stack, queue, graph, tree etc. (6)
2. Divide and conquer- general method, binary search, finding maximum and minimum, merge sort, quick sort, STRASSEN's matrix multiplication, convex hull. (6)
3. The greedy method- KNAPSACK problem, tree vertex splitting, job sequencing with dead lines, optimal merge pattern, single source shortest paths. (6)
4. Dynamic programming- Multistage graphs, All pairs shortest path, optimal binary search trees, string edition, 0/1 KNAPSACK, reliability design, traveling salesman problem, flow shop scheduling. (6)

Section – II

5. Basic traversal and search techniques- Techniques for binary trees, Breadth first, depth first search, connected components and spanning trees, bi connected components and Depth First Search (DFS), Breath First Search (BFS) (6)
6. Back Tracking- The 8 Queen's problem, sum of subsets, Graph coloring, KNAPSACK problem. (6)
7. Branch and bound- The method, 0/1 KNAPSACK problem, Traveling salesman problem, Efficiency considerations (6)
8. Algebraic problems- the general methods, evaluation and interpolation, the FFT modular arithmetic even faster evaluation and interpolation. (6)

Text Book:

1. Fundamentals of computer algorithm by Horowitz and Sahni, Galgotia

Reference Books:

1. Design and analysis of algorithm by Aho and Ullman, Addison Wesley and company – 2008.
2. Data Structures and Algorithms by Alfred V. Aho, Jeffrey Ullman-Pearson Education Asia-Seventh Indian reprints 2002.
3. Algorithms in Nutshell by George Heineman, Gary Pollice-SPD-Oct 2008.

3MCAR2 -Operating System-I

Theory:4 Hours Per Week Theory:100 Marks

Section – I

1. What is Operating System, Types of systems, types of computer system structures and Operating system structures. (5)
2. Process Management - Process Concept, Process scheduling, operations on processes, cooperating processes, interprocesses communication, communication in client server systems. (5)
3. CPU Scheduling - Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling, real time scheduling, Algorithm evaluation, Process scheduling models. (6)
4. Process Synchronization – The critical –Section problem, synchronization hardware, and semaphore, classic problems of synchronization, critical regions and monitors. (6)

Section – II

5. Deadlock - System Model, Deadlock Characterization, Resource-Allocation Graph, Methods for Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. (6)
6. Memory Management - Concept, Memory Management Techniques, Swapping, Contiguous Memory Allocation, Memory Protection, Memory Allocation, Fragmentation, Paging, Basic Method, Segmentation with Paging. Virtual Memory Concept, Demand Paging, Page Replacement (8)
7. File System - File System Implementation, Allocation Methods, Free Space Management, Efficiency and Performance. (6)
8. I/O Systems and Mass Storage - I/O Hardware, Polling, Interrupts, DMA, Disk Structure, Disk scheduling, FCFS Scheduling, SSTF Scheduling, Selection of Disk Scheduling Algorithm, Disk Management (6)

Text Book:

1. Operating systems: Concepts: By Abraham Siberschatz, Peter Galvin- Willey- Sixth edition.

Reference Books:

1. Operating systems: By Achyut Godbale-TMH Publications.
2. Operating systems By K.A. Sumitradevi and N.P.Banashree- SPD- First Edition 2008.
3. System programming and operating systems by D.M. Dhamdhare-TMH –Second Edition.

3SMCAR3 - RELATIONAL DATA BASE MANAGEMENT SYSTEM

Theory:4 Hours Per Week

Theory: 100 Marks

Practical: 2Hours / Week Term Work: 25 Marks Practical Oral Exam: 50 Marks

Section - I

1. Basic concepts: Data modeling, Records, Files, abstraction and data integration, Three-level architecture, Components of DBMS, advantages and disadvantages, data models introduction, data associations, data models classifications, Relational data model, network data model, hierarchical model. (6)
2. File organization: Introduction, Serial files, sequential files, index-sequential files, direct files, secondary key retrieval, indexing using tree structures, logical and physical pointers, record placement. (6)
3. Relational model: Introduction, relational database Relational algebra, relational calculus, data manipulations, and physical implementation issues. (6)
4. Relational database manipulation: introduction, SQL, Data manipulations, views, Embedded data manipulations, QBE (6)

Section - II

5. Relational database design: Relational schema, relational database, anomalies in database, universal design, functional dependency, relational database design.(6)
6. Synthetic approach and higher order normal forms: Problems in decomposition, normalization, multi-valued dependency, normalization using join dependency, domain key normal forms. (6)
7. Query Processing: Introduction, general strategies for query processing, transformation into an equivalent expression, expected size of relations, statistics in estimation, query improvement, query evaluation, evaluations of calculus, view processing, typical query processor. (6)
8. Recovery: Reliability, transactions, Recovery in centralized DBMS, reflecting updates to database and recovery. Buffer management, virtual memory and recovery, other logging schemes, cost comparison, disaster recovery. (6)

Text Book:

1. An introduction to database Systems By Bipin C. Dasai – Revised Edition- Galgotia Publications ltd.

Reference books:

2. Database Management Systems Designing and building business applications by Post, Tata McGraw Hill Publications – 2nd Edition.
3. Database concepts by Korth - Tata McGraw Hill Publications -5th Edition
4. Database systems by Ramkrishna and Gherke - Tata McGraw Hill Publications 3rd edition.
5. An Introduction to DBMS by C.J. Date, Pearson Publication 7th Edition (LPE)

Term work: It should consist of minimum 08 programs based on above syllabus in ORACLE, MS SQL SERVER.

List of Practicals:

- 1.Introduction to SQL –Queries and sub queries.
- 2.Use of control structures.
- 3.To demonstrate the use of cursor for loop.
- 4.To demonstrate the use of predefined exceptions.
5. To demonstrate the use of use defined exceptions.
6. To demonstrate the use of implicit cursor.
7. To demonstrate the use of explicit cursor.
8. To demonstrate the use of reference cursor.
- 9.To demonstrate the use of functions in PL/SQL.
10. To demonstrate the use of procedure in PL/SQL.
11. To demonstrate the use of package in PL/SQL.
12. To demonstrate the use of trigger in PL/SQL.
- 13 To demonstrate the use of ODBC connection.

3SMCAR4 - COMPUTER NETWORKS

Theory:4 Hours Per Week Theory:100 Marks
Practicals: 2 Hours / Week Term Work : 25 Marks

Section – I

1. Introduction- Uses of computer networks, Network hardware, Network software, Reference models, Example Networks, Example data communication services, Network Standardization. (6)
2. The Physical Layer- The theoretical basis for data communication, transmission media, Wireless transmission, Broadband ISDN and ATM, Cellular radio, communication satellites. (6)
3. Data Link Layer- Design issues, error detection and correction, elementary datalink protocol, sliding window protocol, Protocol Specification and Verification. (6)
4. The Medium Access sub- Multiple Access protocols- ALOHA, CSMA protocol, Collision-Free protocols. IEEE standard 802 for LANS and MANS-802.3, 802.4, 802.5, Comparison of 802.3, 802.4, 802.5. (6)

Section – II

5. Bridges–Bridges from 802.x to 802.y, Tranparent bridges, source routing bridges, comparison of 802, Remote bridges. High-speed- FDDI, Fast Ethernet, HIPPI, Fiber channel LANS, Satelite Networks- Poling ALOHA, FDM, TDM, CDMA. (6)
6. Network layer- Design issues, Routing Algorithms-Optimality principles, shortest path routing, flooding, flow-based routing, Hierarchical routing, Broadcast routing, multicast routing, Congestion control Algorithms- General principles, prevention policies, traffic shaping, flow specification, congestion control in virtual circuit subnets, choke packets, load shedding, Jitter control, congestion control for multicasting. Network layers in Internet- IP protocol, IP address, and subnets. (8)
7. Network layers in the Internet- The IP protocol, IP addresses, subnets, Internet Control protocols, Internet multicasting, Ipv6.Network layers in ATM networks- Routing and switching, quality of services, congestion control, ATM LANs. (6)
- 8 Transport Layer- Transport Services, Elements of Transport protocols, Simple Transport protocol-primitives, transport entity, finite state machine, TCP and UDP-Service model, segment header, connection management, congestion control, timer management, UDP. (6)

Text Book:

1. Computer networks by Tanenbaum- PHI – Third Edition.

Reference Books:

1. Data and Computer Communications by William Stallings- PHI.
2. Computer networks, protocol standards and interface by Uyles Black

Term work: It should consist of minimum 08 programs based on above syllabus.

List of Practicals:

1. Study of various networking components.
2. To study OSI model.
3. Program to implement framing methods and binary file transfer.
4. Program for half and full duplex transmission.
5. Program for flow control and error control in TCP & UDP.
6. Program for shortest path routing .
7. Program to study routing protocols.
8. To study FTP commands.

3SMCAR5 - THEORETICAL COMPUTER SCIENCE

Lectures : 4 Hours per Week Theory:100 Marks

Section I

- 1) Undecidability: (6)
Recursively enumerable and recursive, Enumerating a language, More general Grammars Context sensitive languages, Not all languages are recursively enumerable, Universal Turing machine, Rice's Theorem and more undecided problems, Recursive function theory proof of properties of program, Solved example.
- 2) Turing Machine Model: (6)
Definition, transition function, Instantaneous description and moves, programming turing machine, acceptors, Recognize language, transducers, Complete language and functions, modifications of turing machines, n-track turing machine, semi-finite tape/offline/multitape/ND turing machine, multidimensional /two –state machines.
- 3) Chomsky Hierarchy: (6)
Context sensitive grammars and language, linear bounded automata, relationship of other grammars, Chomsky hierarchy, Extending the Chomsky hierarchy, unrestricted grammar, Random access machine.
- 4) Computability: (6)
Formal Systems, Recursive function theory, primitive recursive functions, composition and recursion, Ackermann's Function, Complexity theory, polynomial Time algorithms, Non deterministic polynomial time algorithms, Inter bin packing, Boolean satisfiability.

Section II

- 5) Lexical Analysis and Syntax analysis: (6)
Role of lexical analysis, input buffering, specification of tokens, reorganization of tokens, language specifying of lexical analyzer, design of regular analyzer generator, optimization of DFA based pattern matches. The role of parser, Context free grammar, Top down parsing, bottom up parsing, Operator precedence parsing, LR parsing, using ambiguous grammar, Parse generator.
- 6) Intermediate code generation (6)
Intermediate language, declaration, assignment state, Boolean expression, case statements, back patching, procedure calls.
- 7) Code generation: (6)
Issues of design of code generator, the target machine, run time storage management, basic blocks of flow graph, next use information, A simple code generator, Register allocation and assignment, peephole optimization, code generating a code from drags, dynamic programming code generation algorithm, code generator generators.

8) Code optimization: (6)
Introduction, Principles of code optimization, optimization of basic blocks loops in flow graphs into global data flow analysis, iterative solution of data flow equation, code improving transformations dealing with alies, A tool for flow analysis, Estimation types, Symbolic debugging of optimization code.

Text books:

- 1) Theory of automata, formal lang. & compu. By S.P.Eugene Xavier -New age international publication (Unit 1 to 4).
- 2) Compilers –principles, techniques, tools-Pearson education (unit 5 to 8).

Reference books:

1. Introduction to languages and Theory of computation by John C. Martin, TMH (unit 1 to 4)
2. Compiler Construction By D.H.DHAMDHARE-Macmillan Pub.- Second Edition.. (unit 5 to 8)
3. Theory of Computation by A. M. Natrajan, A. Tamilarasi.- New age Pub-2006.
4. Theory of computer science By E.V.Krishnamurthy- EWP Ltd- edition 1983.
5. Theory of computer science By K.L.P Mishra-PHI –Second Edition.
6. Compiler Design By Dr. O.G.Kakde-LP Publication Fourth Edition.

3SMCAR6 Programming Laboratory-III

Practical : 4 Hours per Week Practical Oral : 50 Marks
Tutorial: 2 Hours Per Week Term work : 25 Marks

Objectives –

- To train the student for programming using true object oriented language-JAVA
- To train the students on the concepts of Applets, JDBC etc.

Unit 1:Basics of Java:

Java's importance to the Internet, Java's Magic: The Byte Code, Java buzzwords, Data types, basic syntax of Java, Classes in Java: Introduction to Methods, Constructors, This Keyword, Overloading Methods, Overloading Constructors, Using objects as parameters, A closer look at argument passing, Returning, objects, Understanding Static, Command Line Arguments. Inheritance: Basics, Using Super, Method Overriding, Abstract methods and Class, Using Final with Inheritance, Packages, Importing Packages and Interfaces.

Unit 2: Exception handling:

Fundamentals, Exception Types, Uncaught Exceptions, Using Try and Catch, Multiple Catch Clauses, Throw, throws, finally, Built-in Exceptions and creating your own Exception, Sub Classes, Multithreading: Java Thread Model, The Main thread, Creating a Thread, Creating Multiple Threads, Using Alive () and Join (), Thread Priorities, Synchronization, Inter thread Communication, Suspending, Resuming and Stopping Threads.

Unit 3: Applets:

An Overview of Applets, the Life Cycle of an Applet, creating applets, the Graphics Class, Using Colors, Displaying Text, Using Applets in a Web Page, JDBC: DBMS, RDBMS Concepts, Introduction to SQL, Basics of Database Connectivity, Introduction to JDBC, JDBC Architecture, Steps to create JDBC Application, JDBC Interfaces, classes and Exceptions.

Unit 4: Event Handling:

Model View Controller, Event Classes, Event Listeners, Adapter Classes, Introduction to Abstract Window Toolkit (AWT), Swing: Labels, Buttons, Canvases, Check Boxes, Choices, Text Fields And Text Areas, Lists, Panels, Windows and Frames, JApplet class, Menus And Menu Bars.

Unit 5 I/O Package:

Files and Directories, Overview of Codes and Streams, Buffered Character Streams, the Print Writer Class, Byte Streams.

Unit 6 Servlets:

Introduction To Web Application Development, Server Side Programming, Introduction To Servlets, Servlet Lifecycle, Servlet With HTML, Server Side Includes, HTTP Tunneling, Servlets With JDBC, Steps to configure Tomcat for server.

Text Books:

1. Herbert Schildt "The Complete Reference Java2" By Herbert Schildt- TMH Publications-5th Edition.

Reference Books:

1. Core Java Volume I and Volume II: Sun Microsystems Press
2. Deitel & Deitel: "How To Program JAVA", Pearson Education.
3. E. Balguruswamy: "Programming with Java- A Primer", TMH.

Term work: It should consist of at least 15 experiments/ assignments based on the above syllabus.

Suggestive list of experiments:

1. Design a simple class to represent Time
2. Design a class to demonstrate overloaded constructor in java
3. Design a program to display string array in sorted order
4. Design a class to demonstrate use of inheritance and interface
5. Design a class to create a package and use package in another class
6. Design a program to create user defined exception class
7. Design a class to read from keyboard and save data in file
8. Design a program to display digital clock in applet
9. Design a program to create logon form for user
10. Program to create list of images and display selected image in applet
11. Program to create a frame to enter details of student
12. Program to change background color of any swing component using scroll bar.
13. Program to create text editor for new, open and save functions.
14. Program to create free hand drawing tool using keyboard.
15. Program to demonstrate pop up menu.
16. Program to save student details in a database
17. Program to display student details in a frame
18. Program to create a simple client-server communication using RMI
19. Program to create a simple chat application between client- server using networking.
20. Program to create a Basic Servlet

3SMCAR7- SEMINAR - III

Tutorial: 2 Hours Per Week Tern work : 25 Marks

The aim of the seminar is to make the students study something extra other than curriculum. They are expected to go through the latest trend pertaining to computer and allied fields and deliver the seminar and submit the report.

The other important aim of the seminar is to encourage and develop the faculties of personality, aptitude and knowledge of the students.

4SMCA1 - MANAGEMENT INFORMATION SYSTEM

Theory:4 Hours Per Week Theory:100 Marks

Section – I

1. Introduction to Management Information System (MIS)- What is MIS? Nature, role, need and importance of MIS, evolution of Management through information system, management function and decision making (5)
2. MIS design- Problem definition, determination of system objective and sources of information, MIS design methodology, detailed MIS design including acquisition of equipment, procedures for implementation and training. (6)
3. Decision support system- study of major financial productions manpower and marketing MIS (4)
4. General system concepts- system objective, control system, information and communication (4)
5. Concepts of Decision Support System, application of the concepts of the MIS to computer science (4)

Section II

6. Introduction to Economics- Concepts of utilities, law of diminishing marginal utility (5)
7. Law of demand and supply- Elasticities of demand and supply, laws of returns to scale, demand supply curve, types of demand (4)
8. Fixed costs, variable costs, envelop curve, short and long run cost, firm profit maximization, cost-output relationship (5)
9. Determinants of price under different market structure, equilibrium, short run, and long run equilibrium, perfect competition, monopoly, oligopoly, monopolistic competition (5)
10. Interest rates- balance of payments, trade cycles, stock exchange, International trade (4)

Reference Books:

1. Information system for modern management by Murdic R.G. & Ross J.E – PHI- Third edition.
2. Management Information System by Kantar J
3. Decision Support system by S. Pargul & Watson
4. Management Information System by Gupta R.C
5. Managerial economics by Khurmi
6. Managing with Information By Jerome Kanter-PHI –Forth edition.

4SMCAR2- Object Oriented Modeling & Design

Theory: 4 Hours Per Week Theory: 100 Marks
Practicals: 2 Hours / Week Term Work: 25 Marks

Section – I

1. Introduction – What is Object Orientation, What Is OO Development, OO Themes, Evidence For Usefulness of OO Development. Modeling, Abstraction, Three Models. (6)
2. Class Modeling- Object and Class concept, Link and Association Concepts Generalization and Inheritance. Navigation of class model. (6)
3. Advanced Class Modeling – Advanced Object and class concept, N-ary, N-ary Association, Aggregation, Abstract Class, Multiple Inheritance. (6)
4. State Modeling – Events, States (4)

Section – II

5. Advanced State Modeling – Nested State Diagrams, Relation of class and State models. (4)
6. Interaction Modeling – Class Model, State Model, Interaction Model (6)
7. Advanced Interaction Modeling – Use Case relationship, Procedural Sequence Model, Special Constructs. (6)
8. System Design – Overview, Estimating performance, Making reuse plan, Breaking system into subsystem, Allocation of sub systems (6)

Text Book:-

1. Object Oriented Modeling & Design By Michael Blaha, James Rumbaugh - PHI-Second edition.

Reference Books: -

1. Object Oriented analysis and Design with applications By Booch -Addison Wesley- Second edition.
2. UML User Guide – Booch, Rumbaugh, Jacobson (Addison Wesley).
3. UML In a Nut Shell By Dan pilone- SPD pub- Fourth edition.
4. Learning UML 2.0 By Miles and Hamilton- SPD-First Edition.

Term Work: It should consist of minimum 8 assignments based on the syllabus.

Suggestive List Of Experiments for Term Work –

1. Discuss the classes in each of the following list have in common
You may add more classes to each list.
 - a. Pipe check, valve, filter, pressure gauge
 - b. Bicycle sailboat, car, truck, airplane, horse, motorcycle
 - c. Nail, screw, revet, bolt
 - d. Tent, cave, shed, garage, barn, house, skyscraper.
2. Prepare a list of classes for a controller for a video cassette recorder
3. Prepare written description for class diagrams created by you.

4. Categorize the following relationship into generalization, aggregation, or association, Beware, there may be n-ary association in the list. So do not assume every relationship involving three or more classes is a generalization. Explain your answer.
 - a. A country has a capital city.
 - b. A file is an ordinary file or directory.
 - c. File contains records.
5. Elimination of use of multiple inheritance in class diagram, where it is used.
6. Draw and describe State Diagram for Telephone line
7. Draw and describe nested states for a phone lines.
8. Consider a computer E-mail system
 - a. List three actors; explain the relevance of each actor.
 - b. Prepare Use case diagram
 - c. Prepare sequence Diagram corresponding to each scenario.
9. Consider online railway reservation system
 - e. List actors; explain the relevance of each actor.
 - f. Prepare Use case diagram
 - g. Prepare sequence Diagram corresponding to each scenario.
10. Identify at least 10 use cases for windows explorer. Just list them Textually and summarize the purpose of each use in three or four sentences.

4SMCAR3 - COMPUTER GRAPHICS

Theory:4 Hours Per Week Theory:100 Marks

Section – I

1. Introduction- Overview of computer graphics, type of graphics devices, storage tube graphics display, calligraphic refresh graphics display, raster refresh graphics display, cathode ray tube basics, color CRT, interactive devices (6)
2. Two-dimensional transformation- Principles, Translation, rotating, scaling, Homogeneous coordination system, Matrix representation, Combined transformations. (5)
3. Three dimensional transformation- Three dimensional geometry, 3D transformations, plain geometric projections, reconstruction of 3D images, Inverse Transformations. (5)
4. Hidden surfaces and Hidden line illuminations- Back face removal algorithm, Z buffer algorithm, Scan line algorithm, Painters algorithm, Area sub division algorithm, hidden line illumination. (6)

Section – II

5. Raster scan graphics- Line drawing algorithms (DDA), Bresenham's line generation algorithms, circle generation, scan conversion, real time scan conversion, frame buffers, character display, polygon filling, ellipse generation. (7)
6. Clipping- Two dimensional clipping, Sutherland Cohen sub division line clipping algorithm, Mid point sub division line clipping algorithm, Polygon clipping, Sutherland Hodgman polygon clipping algorithm, Character clipping. (6)
7. Rendering and shading – A simple illumination model, determining the surface normal, determining the reflection vector, Gouraud shading, phong shading, transparency, shadows, texture. (5)
8. Computer animation- Design of animation sequence, General computer animation techniques, Raster animation, computer animation languages, Key frame system, Concept of morphing, simulation, acceleration, motion specification, goal directed systems. (6)

Text Books:

1. Mathematical element for computer graphic - Roger D.F. and Adama J.A.
2. Procedural element for computer graphic - Roger D.F.

Reference Books:

1. Computer graphics by Donald Heren
2. Computer graphics by Bhandari S.P. and Joshi S.A.
3. Computer Graphics by Steven Harington
4. Principal of interactive computer graphics by Newmann and Sproull

4SMCAR4 – OPERATING SYSTEM DESIGN

Theory:4 Hours Per Week Theory:100 Marks

Section-I

1. Understanding The Unix Commands – Locating Commands, Internal And External Commands, Command Structure, General Purpose Utilities- cal, date, echo, who Handling ordinary Files-cat, cp, rm, mv, more, file, vi Editor Basics (6)
2. Advanced Shell Programming – Shell and Sub Shells, () and {}:Sub-Shell or Current Shell, Exporting Shell Variables, Arrays, String Handling, Shell Functions (6)
3. Overview and kernel: System structure, user prospective, operating system services, architecture of UNIX OS, system concepts, kernel data structure, system administration. (6)
4. Files: Buffer cache, headers, structure of buffer pool, reading and writing disk blocks, I nodes, structure of regular files, directories, conversion of path name to I node, super block, allocation disk blocks (6)

Section-II

5. System calls: Open, read, write, file and record locking, l seek, close, file creation, creation of special files, change directory, root, owner, mode, stat and f stat, pipes and dup, mounting and un-mounting file system, link and unlink, abstraction and maintenance of files. (6)
6. Process- Process states and transition, layout of system memory, context of process, manipulation of process address space, sleep Process control and scheduling- process creation, signals, termination, awaiting process termination, invoking other programs, user ID of the process, change in the size of the process, shell, system boot and the INIT process, process scheduling, system call for time and clock (8)
7. I/O sub-system - The I/O sub-system, driver interfaces, disk drivers, terminal drivers, streams. (4)
8. Inter process communication- Process tracing, system V IPC, network communications, sockets (4)

Text Book:

1. The design of the UNIX operating system By M. J. Bach- PHI – For UNIT 1 to 2
2. UNIX Concepts and Applications By Sumitabha Das- TMH -Third Edition- For UNIT 3 to 8

Reference Books:

1. Operating system design and implementation – A.S.Tanenbaum, PHI
2. Operating system design – D. Cohen, PHI
3. Introducing UNIX System V – Rachel Morgan and Henry McGilton TMH.
4. Running Linux By Welsh, Dalhemer-SPD-Fourth Edition.

4SMCAR5-SOFTWARE TESTING

Theory: 4 Hours Per Week

Theory: 100 Marks

Practical: 2Hrs/week Term work: 25Marks Oral Exam: 25Marks

Section- I

1. Software testing fundamentals – testing objectives, testing principles, testability, Test case design, White box testing, Basic path testing, control structure testing, Black-box testing, Unit testing, Integration testing, top-down integration, Bottom-up integration, bi-directional integration, system integration. (5)

2. System and acceptance testing – System testing overview, functional system testing - design/architecture verification, business vertical testing, deployment testing, beta testing, certification, standards and testing for compliance, Non-functional testing – setting up the configuration, coming up with entry/exit criteria, balancing key resources, scalability testing, reliability testing, stress testing, interoperability testing, Acceptance testing- acceptance criteria, selecting test cases for acceptance testing. (6)

3. Performance testing – Factors governing performance testing, methodology for performance testing. (4)

4. Web testing, Verification & Validation, test metrics. (5)

Section II

5. Regression testing – What is regression testing?, types of regression testing, How to do regression testing? (5)

6. Object oriented testing- Unit testing a set of classes, Integration testing, system testing and interoperability of OO systems, regression testing of OO systems. (5)

7. Test Planning – preparing a test plan, scope management, deciding test approach, setting up criteria for testing, identifying responsibilities, staffing and training needs, resource requirement, testing tasks (5)

8. Test Management, Test Process, Test Reporting, Test Automation, Factors to consider in automation, Challenges in test automation (5)

Textbook:

1. “Software Testing” By Srinivasan Desikan, Gopalaswamy Ramesh- Pearson Education-First edition.

Reference books:

1. Software testing foundations By Spillner, Linz, Schaefer-SPD.
2. The software test Engineer’s Handbook By Bath, Mckay-SPD.
3. Software Engineering by Pressman, TMH.

Term work: It should consist of minimum 8 assignment based on the syllabus.

Suggestive list of programs:-

1. Study of testing tools such as win runner
2. Recording test cases in context sensitive mode
3. Recording test cases in analog mode
4. Testing an application using synchronization checkpoint
5. Test case design in batch mode
6. Testing an application using GUI checkpoints
7. Testing an application using bitmap checkpoint
8. Manual Testing of an application
9. Test case design for functional testing

4SMCAR6-Programming Laboratory - IV

Practical:4Hrs/week POE:50 Marks
Tutorial: 2 Hrs/week Term work:25Marks

Objectives:

- To Study website development using GUI environment.
- To develop programming skills with ASP.NET

1. Introduction

Internet terminology, Web Server, Browser, Client Vs Server Side Scripting Introduction to Java Script (Client Side Script) – Variables, Document Object Model, Functions, Event Handling. Introduction to .NET framework, ASP.NET namespace hierarchy, Page life cycle, view state, postback, IsPostBack property, HTML and Web Controls.

2. Web Controls

Text Box, Label, Button, Link Button, Hyperlink Button, Image Button, List Box, Drop DownList, Checkbox, Radio Button, Checkbox List, RadioButtonList, Panel.

3. Validation Controls & Rich Controls

Required Field Validator, Range Validator, Compare Validator, Regular Expression Validator, Custom Validator and Validation Summary, Rich Controls – Calendar Control, AdRotator Control.

4. ADO.NET:

Overview of ADO.NET, Advantages of ADO.NET, Connected and disconnected data access, Connection, Command, Data Reader, Data Adapter, Dataset, Data Tables Data Grid.

5. Passing Data between Pages & Web Services

Cache, Session, Context, Query String, Post, Global, Ajax, Introduction to web services.

Reference Books:

1. Asp. Net: The Complete Reference By Matthew MacDonald - TMGH.
2. Asp.Net 3.5 By Liberty, McDonald, Horwitz –SPD-Second Edition.
3. ASP.NET By Stephen Walther - Unleashed.
4. ASP.NET 2.0 with AJAX by Liberty, McDonald-SPD.

5. C# 3.0 By Liberty, McDonald- SPD

Term work: It should consist of minimum 14 experiments based on the syllabus.

Suggestive List of Experiments:

1. Construct simple web page displays text on browser.
2. Use of Web server control and there events and post back.
3. Use of Web form, fill information in form and submit it.
4. Make use of viewstate of the object in web form.
5. Online Test using ASP.NET (Use View State, Panel, Textbox, Radio Button, Button etc.)
6. Design Sign Up form and validate User Name (Minimum 8 character Maximum 15 and only characters and under score), Password (Minimum 8 Characters) and Retype Password (Both should be same), Phone No (Only digits), Email-id etc.
7. Use of all validation control in assignment.
8. Make use of session and cookies in web page.
9. Design signup form and Save Signup form information in Database.
10. Make use of ADO.NET with Data grid View, List View
11. Design a web page to display, add, delete & edit information from database.
12. Design a meeting scheduler using Calendar control.
13. Display Advertisements using ad Rotator Control
14. Create a simple web service.

4SMCAR7-Mini Project

Tutorials : 2 Hours/week

Oral Exam : 50 Marks

Guidelines for Mini Project:

- Students must submit the topic within first fifteen days from the start of the semester.
- Follow Software Development Life Cycle Phases for project development.
- Prepare synopsis on the following guidelines:
 1. Define the problem with specifications
 2. Define the functionality of the project
 3. Design a solution for the project
 4. Implement the solution. (Also keep a record of total number of man hours spent for the mini project.)
 5. Present and evaluate the project.
- The report of this Mini project is to be submitted in typed form with Binding.
- The report should have all the necessary diagrams, charts, printouts and source code.
- The work has to be done in groups.
- The suggestive format of the report is as follows:

(Only one report should be submitted per group as a part of term work submission.)

Title of the Mini Project:

Names & Roll Nos of the students:

Name of the guide:

Chapter 1: Introduction

Chapter 2: Requirement specifications

Chapter 3: Design and implementation. (This chapter will include the entire design process with necessary DFDs, other Diagrams, design methodologies and other design and implementation details.)

Chapter 4: Performance Analysis. (This chapter will include Testing and evaluation process. It should also mention about the method of testing used. It will include test case analysis with results. It should also indicate how better the designed system performs with tabular results.)

Chapter 5: Concluding Remarks (This should include conclusion & future scope)

- The term work will be allotted on mini project. The mini project may relate to any topic studied throughout the third year or industrial problems.
- There will be external oral examination at the end of semester.

3SMCAR8 - MULTIMEDIA TOOLS

Section – I

1. Multimedia Hardware – Memory & storage devices, Input devices, Output devices, communication devices.
2. Multimedia Softwares – basic tools – Text editing and word processing tools, OCR software, painting and drawing tools, 3-D modeling and animation tools, image editing tools, sound editing tools, animation, video, and digital movie tools.
3. Making instant multimedia – linking multimedia objects, office suits, word processors, spreadsheets, databases, presentation tools.
4. Multimedia authoring tools – Types of authoring tools, card and page based authoring tools, icon based authoring tools, time based authoring tools, Object oriented authoring tools.

Section – II

5. Multimedia building blocks – Text – fonts and faces, using text in multimedia, computers and texts, font editing and designing tools, hypermedia and hyper text.
6. Sound – multimedia system sound, MIDI verses digital audio, digital audio, making MIDI audio, Audio file format, Working with sound, NIFF, adding sound to multimedia project
7. Images – Planning, Making still images, color, image file format.
8. Animation - principles of animation, techniques and file formats, making animation that works.

Text Book :

1. T. Vaughan: Multimedia: Making IT work (3/e)(TMH)

Reference books:

1. Multimedia in action: James E. Shuman, Vikas
2. Multimedia and the web- Calleen Coorough, Vikas.

4SMCAR8 – Information Technology Concepts

Section-I

1. Information: Information Concepts, classification of Information, methods of data and Information collection, values of Information, general model of a human as an Information processor, organization of Information and its implication, Choice of Information technology, nature of IT decision and its implementation plan, introduction to Information system, Information system with organization, technology of Information system, Information system, human factor and user interface, programming language for system coding.
2. Tools of analysis and design: Introduction to system analysis and design, fact finding methods, system representation methods, numerical processing, non-numerical Information processing, computer system design, MIS and system analysis.
3. Application system design: Introduction, developing new logical systems, implementation planning, input output media selection.
4. Developing physical system, documentation estimating run time errors.

Section-II

5. Internet and intra net: Introduction to internet and intranet, modes and facilities in internet, location in cyber space, hardware and software requirements to get connected with internet, communication software, exchange of messages through e-mail, browsing the net with WWW, access to WWW sites.
6. Introduction to web page designing, designing of static and dynamic web pages with tools and codes.
7. Virtual reality: concept of virtual reality, purpose of virtual reality, hardware and software requirements, input devices, virtual reality software, the virtual reality environment, architecture, military and scientific built of virtual reality project.
8. Video conferencing: Introduction to VCS, types of VC, services and speed of VC, conferencing with PCs, concept of multipoint conferencing.

Reference Books:

1. Information system design by Brooks, Grouse and Lawrence
2. Analysis and design of Information system by Rajaraman
3. Virtual reality construction Kit by Joe Gradeoki
4. The internet by Harley Hahn
5. Management information system by W.S. Jawadekar
6. Mains stream video conferencing by Joe Dural and Charles Saucer.

4SMCAR9 - Object Oriented Database Concepts

Section-I

1. Object Oriented Programming & Methodologies: The Paradigm Shift, Object Oriented Concepts, Object Oriented Programming (OOP), Object Oriented System, Levels of Object Orientation, Inheritance, Polymorphism, Multiple Inheritance, Class-based Vs Classless object orientation, Delegation, Availability of OOT and its Applications, OOPL such as Simula, Smalltalk, Common Lisp Object System (CLOS), object in C++, Class libraries, The Necessity for formal methods in OOP, Benefits of OOP.
2. Relational Database and OODBMS: Database Applications, Functions Expected of Conventional Databases, The Impedence Mismatch problem, The problem with Embedding Query statements in programs, SQL DBMS problems, Data Models for Complex Objects, The Nested Relational Database Model (NRDM), Object-Oriented Database Systems, Characteristics of Applications that require OODB, Potential problems with OOP/OODBMS.
3. Persistence & Object Identity: The Lifetime of Data Persistence, Security of Object, Principles of orthogonal persistence, Costs of Providing Persistence. Object Dynamics, Identity in Programming Language, Data Identity in Relational Databases, The need for Object Identity, Problems with Employing Value- Based Representation of objects.

Section-II

4. Evaluation of OODBMS & OODB Architecture: User Demands of OODB, OODB Architectures, Architectures of the O₂ System, The Zeitgeist Architecture, The Object Store Architecture. Evaluation of OODBMS, The need for prototypes, Technical & non-technical issues, Bench marking and OODBMS, Evaluations, Benchmarking Applications to Test Throughout, Types of Data the Benchmark should Test Evaluation: Manipulations of sets, collections etc.
5. Object Management group: Technical goal of OMG, Abstract Object Model, Object semantics and implementation, OMG reference model, OMA reference model, Object

request broker, object services, common facilities, application objects, CORBA specifications, ORB core, ideal compiler.

6. Research in OODBMS: Objects in distributed systems, data sharing, object oriented distributed systems, next generation of OODBMS applications

Text Books:

1. Object – Orientation Databases Technology, Applications and Products - Bindu R. Rao (McGraw Hill Publications Edition 1994)

Reference books:

1. C++ Databases Development Second Edition By A1 Stevens (BPB Publication)
2. Object Oriented Modeling and Design By James Rambaugh (PHI).

EQUIVALENCE OF SYMCA SUBJECTS (w.e.f. 2009-10)

SYMCA PART – I

Pre- revised Subjects		Equivalent subjects under Revised Syllabus	
Code of the subject	Name of the subject	Code of the subject	Name of the subject
3SMCA1	Computer Algorithm	3SMCAR1	Computer Algorithm
3SMCA2	Multimedia & Web Tools	3SMCAR8	Multimedia Tools
3SMCA3	Relational Database Management System	3SMCAR3	Relational Database Management System
3SMCA4	Computer Oriented Operation Research	2SMCAR3	Computer Oriented Operation Research
3SMCA6	Programming Laboratory – III	3SMCAR6	Programming Laboratory – III
3SMCA5	Computer Graphics	4SMCAR3	Computer Graphics

SYMCA PART – II

Pre- revised Subjects		Equivalent subjects under Revised Syllabus	
Code of the subject	Name of the subject	Code of the subject	Name of the subject
4SMCA1	Management Information System	4SMCAR1	Management Information System
4SMCA2	Information Technology	4SMCAR8	Information Technology Concepts
4SMCA3	Computer Networks	3SMCAR4	Computer Network
4SMCA4	Operating System Design	4SMCAR4	Operating System Design
4SMCA5	Object Oriented Databases	4SMCAR9	Object Oriented Database Concepts
4SMVA6	Programming Laboratory – IV	4SMCAR6	Programming Laboratory – IV

Note: Syllabus of the equivalent subjects **Multimedia Tools** (3SMCAR8), **Information Technology Concepts** (4SMCAR8) and **Object Oriented Database Concepts** (4SMCAR9) are as given below.

EQUIVALENCE OF FYMCA SUBJECTS (w.e.f. 2008-09)

FYMCA PART – I

Pre- revised Subjects		Equivalent subjects under Revised Syllabus	
Code of the subject	Name of the subject	Code of the subject	Name of the subject
1SMCA1	Programming Language Concepts	1SMCAR8	Programming Languages
1SMCA2	Computer Organization	1SMCAR2	Computer Organization
1SMCA3	Computer Oriented Numerical & Statistical Methods	1SMCAR3	Computer Oriented Numerical & Statistical Methods
1SMCA4	Behavioral & Organizational Science	1SMCAR4	Behavioral & Organizational Science
1SMCA5	Discrete Structure	1SMCAR5	Discrete Mathematical Structure
1SMCA6	Programming Laboratory - I	1SMCAR6	Programming Laboratory - I

FYMCA PART – II

Pre- revised Subjects		Equivalent subjects under Revised Syllabus	
Code of the subject	Name of the subject	Code of the subject	Name of the subject
2SMCA1	Data Structure	2SMCAR1	Data Structure
2SMCA2	Software Engineering	2SMCAR2	Software Engineering
2SMCA3	Digital Electronics and Microprocessor	1SMCAR1	Digital Electronics and Microprocessor
2SMCA4	System Software	2SMCAR4	System Programming
2SMCA5	Data Communication	2SMCAR5	Data Communication
2SMCA6	Programming Laboratory - II	2SMCAR6	Programming Laboratory - II

Note: The syllabus of the equivalent subject Programming Languages (1SMCAR8) is as given below

1SMCAR8 - Programming Languages

Section – I

1. Programming language processors: The structure and operation of a computer, Hardware and firmware computers, translators and software simulated computers, syntax semantics and virtual computers, hierarchies of computer, binding & binding time.
2. Data types: Data objects variables and constants, data types, specification of elementary data types, implementation of elementary data types. Declarations, type checking and type conversion, assignment and initializations, numeric data types, enumerations, Booleans, characters,
3. Structured data types: Structured data objects and data types, specification of data

structure types, implementation of data structure types, declaration and type checking for data structures, vectors and arrays, records, character strings,.

Section – II

4. Sub-programs and programmer defined data types: Evolution of the data type concept, abstraction, encapsulation and information hiding, sub programs, type definitions, abstract data types
5. Sequence control: Implicit and explicit sequence control, sequence control within expressions sequence control between statements, subprogram sequence control, recursive sub-programs, exceptions.
6. Data control: Names and referencing environments, static and dynamic scope, block structure, local data and local referencing environment, shared data,

Text Book:

1. Programming languages- design and implementation – Terrence W. Pratt (PHI).