# SOLAPUR UNIVERSITY, SOLAPUR

# MCA – II (UNDER ENGG.)
# YEAR 2014-15

| Solapur University, Solapur | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Syllabus of Second year MCA (Under faculty of Engg.) w. e. f. 2014-15** | | | | | | | | |
| **Semester** | **Paper Name** | **L** | **T** | **P** | **TH** | **TW** | **POE** | **Total** |
| III | Data Structure | 4 | | 2 | 100 | 25 | | **125** |
| | System Programming | 4 | | 2 | 100 | 25 | | **125** |
| | Computer Networks | 4 | | | 100 | | | **100** |
| | Computer Organization and Architecture | 4 | | | 100 | | | **100** |
| | Computer Graphics | 4 | | 2 | 100 | 25 | | **125** |
| | Programming Laboratory-III (VB.NET) | 2 | | 2 | | 50 | 50 | **100** |
| | Project | | | 2 | | 25 | 50 | **75** |
| | **Total** | **22** | | **10** | **500** | **150** | **100** | **750** |
| **Semester** | **Paper Name** | **L** | **T** | **P** | **TH** | **TW** | **POE** | **Total** |
| IV | Relational Database Management System | 4 | | 2 | 100 | 25 | | **125** |
| | Operations Research | 4 | | | 100 | | | **100** |
| | Design and Analysis of Algorithm | 4 | | | 100 | | | **100** |
| | Programming in Java | 4 | | 2 | 100 | 50 | | **150** |
| | Elective – I | 4 | | | 100 | | | **100** |
| | Programming Laboratory-IV (Web Design Techniques) | 2 | 2 | 2 | | 50 | 50 | **100** |
| | Project | | | 2 | | 25 | 50 | **75** |
| | **Total** | **22** | **2** | **8** | **500** | **150** | **100** | **750** |

**Elective-I**

1. Software Testing and Quality Assurance
2. UNIX Operating System
3. Object Oriented Analysis and Design

# Semester - III
## Data Structure

**Lecture: 4 hrs / week** **Practical: 2hrs / week**
**Theory: 100 Marks** **Term Work: 25**

### Section –I

**1. Introduction to Data Structures: (4 hrs)**

Introduction, Types of data-structure, Time and Space complexity Abstract Data Types (ADT), Array, Structure, Pointers

**2. Linked List: (6 hrs)**

Introduction, Drawback of Sequential Storage, Concept of Linked List, Implementation of Linked List, Operation of Linked List- Creation , Insertion , Deletion, Reverse and Search Operations, Application-Representation of Polynomial, Circular Linked List, Doubly Linked List, Doubly Circular Linked List , Difference between an Array and Linked list

**3. Stack and Queue: (6 hrs)**

Definition of Stack, Static & Dynamic Implementation of a Stack, Applications of Stack- Recursion, Infix, Prefix & Postfix expression, Matching Parentheses in an Expression. Definition of a Queue, Operations on a Queue, Static & Dynamic Implementation of Queue, Types of Queue- Circular Queue, Priority Queue, Dequeue, Applications of Queue.

**4. Searching and Sorting: (4 hrs)**

Search-Linear Search and Binary Search. Sorting- selection, insertion, merge and radix sort

### Section – II

**5. Indexing and hashing: (5 hrs)**

Indexing and its type,Hashing-Definition,functions-modulus,folding,truncation,floating point. Collision resolution techniques- Linear probing, quadratic probing, Rehashing and Separate Chaining, Extended hashing,B and B+ indexing

**6. Trees**: **(8 hrs)**

Tree Terminology, Binary tree and its sequential representation, Binary search trees (BST), search and insertion in binary trees, deletion from a binary search tree, linked list implementation, Traversal algorithms ,Threaded binary trees, Height balanced trees, Heap sort, Huffman's algorithm

**7. Graph :** **(7 hrs)**

Introduction, Graph representation, Adjacency Matrix, Adjacency List, Graph Traversals-Depth First Search, Breadth First Search, Applications of Graph, Wars hall's algorithm for shortest path

**Note: Practical will consist of minimum 10 programs based on above syllabus.**

**Text Books:**

1. Data and file structure by Tanenbaum PHI
2. Data structure by Rajani jindal

**Reference Books:**

1. Data structure using C by Trembly
2. Data structure by Lipschutz, MGH
3. Data Structure through C by Y.P. Kanetkar

# System Programming

**Lecture: 4 hrs / week** **Practical: 2hrs / week**
**Theory: 100 Marks** **Term Work: 25**

## Section-I

1. **Language Processor:** **(5 hrs)**

Introduction, Language Processing Activities, Fundamentals of language Processing, Binding and Binding time, LPDT tools LEX and YACC.

2. **Assembler:** **(10 hrs)**

Elements of assembly language programming, Simple assembly scheme, Pass structure of assembler, Design of two pass assembler: Algorithms and flowcharts.

3. **Macro Assembler:** **(5 hrs)**

Macro definition and call, macro expansion, nested macro call, advanced macro facilities, data structures of macro preprocessor.

## Section-II

4. **Compilers:** **(8 hrs)**

Basic compiler functions, grammars, Lexical analysis, modeling scanner and finite automata, Syntactic analysis, Recursive descent parsing, Code generation, Machine dependent and independent compiler features, machine independent code optimization, Storage allocation, Block structured language, interpreters, p-code compiler, java compiler and environment, compiler-compilers, The YACC Compiler-compiler, N-pass structure of compiler, interpreters.

5. **Loaders and linkers :** **(7 hrs)**

Basic loader functions, absolute loader scheme, A simple bootstrap loader, machine dependent loader features, relocation, Program linking, algorithms and data structures for a linking loader, machine independent loader features, dynamic linking, bootstrap loaders, MS-DOS linker, Cray MPP linker

6. **Software tools:** **( 5 hrs)**

Editors, debug monitors, programming environment, user interface.

**Note: Practical will consist of minimum 10 programs based on above syllabus.**

**Text books:**


1. System programming By Leland L. Beck
2. System software An introduction to systems programming by, By J. J. Donavan


**Reference books:**


1. System programming by j. j. Donavan

2. Compilers: principles, techniques and tools By Alfred Ulman
3. System software: An introduction to system programming By Lenad Beck.

# Computer Networks

**Lecture: 4 Hrs / week** **Theory: 100 Marks**

## Section-I

**1. Computer Network Fundamentals: (6hrs)**

Introduction to Computer Networks, Types of Network, Physical & Logical Topology , Uses of Computer Networks, Hardware Required for LAN, Hardware required for Internetworking- Bridges, Switch, Routers, Introduction to Network operating System, Introduction to Internet,

**2. The Physical Layer (4hrs)**

Guided Transmission Media, Wireless Transmission, Communication Satellites, The PSTN, The Mobile Telephone System, Cable Television

**3. The Data Dink Layer (6hrs)**

Data Link Layer Design Issues Error Detection and correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols: HDLC: High Level Data Link Control, The Data Link Layer In The Internet.

**4. The Medium Access Sub layer (4hrs)**

The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Data Link Layer Switching.

## Section-II

**5. The Network Layer (6hrs)**

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality Of Service, Internetworking The IP Protocol, Subneting, Internet Control Protocols

**6 .The Transport Layer (8hrs)**

The Transport Service, Elements Of Transport Protocols, The Internet Transport Protocol: UDP, The Internet Transport Protocol: TCP: Introduction To TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release

**7. The Application Layer (6hrs)**

DNS – The Domain Name System(Name Space, Domain Name in internet, Distribution of domain name space) Network Security: Cryptography, Packet filter firewall, Proxy firewall, SNMP, SMI, MIB

**Text Book :**
1. Andrew S. Tanenbaum, Computer Networks, 4 th Edition, Pearson Education, Asia, 2002.

**Reference Books:**
1. Alberti Leon – Garcia and Indra Wadjaja, Communication Networks-Fundamental Concepts and Key Architectures, Tata McGraw Hill, Edition-2000.
2. Behrouz A Forouzan, Data Communications and Networking, Tata McGraw Hill, Second Edition, 2001.
3. Computer and Data communication by black

# Computer Organization and Architecture

**Lecture: 4 Hrs / week** **Theory: 100 Marks**

## Section-I

**1. Basic computer organization and design (10 hrs)**

Instruction codes: O*p*eration code, stored program organization, Computer registers: Common bus system, memory address, Computer instructions: Instruction format, instruction set completeness, Timing and control: Control unit of basic computer, example, Instruction cycle: Flowchart, register-reference instructions, Memory-reference instructions: Flowchart, Input-output and interrupt: Input-output configuration, Instructions, Program Interrupt, Interrupt cycle.

**2. Micro-programmed Control (04 hrs)**

Control memory: Microprogrammed control organization, Address sequencing: Conditional branching, mapping of instructions, subroutines, Microprogram Example.

**3. Central Processing Unit (06 hrs)**

Major components of CPU, General register organization: Bus system, control word, Stack organization: Register stack, Memory stack, Instruction formats, Addressing Modes, RISC and CISC characteristics.

## Section-II

**4. Input-Output Organization (08 hrs)**

Peripheral devices, Input-Output interface: I/O bus and interface modules, I/O versus memory bus, Isolated versus Memory-mapped I/O, Asynchronous data transfer: Strobe control, Handshaking,

Asynchronous serial transfer, Modes of transfer, Direct Memory Access: DMA controller, DMA transfer, Input-output processor (IOP): Block diagram of a computer with IOP.

**5. Memory Organization** (**08 hrs)**

Memory hierarchy, Main memory: RAM and ROM chips, Memory address map, Auxiliary memory, Flash memory, Associative memory: Block diagram, Cache memory: Associative mapping, Direct mapping, Set-associative mapping, Virtual memory: Address space and memory space, address mapping using pages, Memory management hardware: Segmented-page mapping.

**6. Pipelining** **(04 hrs)**

Parallel processing: Processor with multiple functional units, Pipelining: Arithmetic pipeline, instruction pipeline.

**Text Book:**

1) Computer System Architecture by M.Morris Mano (Pearson)

**References:**

1. Computer Organization and Architecture by John P.Hayes(TMH)
2. Computer Organization by Hamachar, Vrasenic and Zaky (McGraw Hill)

# Computer Graphics

**Lecture: 4 hrs / week** **Practical: 2hrs / week**
**Theory: 100 Marks** **Term Work: 25**

**Section I**

1. **Introduction** : **(4 hrs)**
   concept and applications of computer graphics and image processing , raster scan display and system, random scan display and system, video controller
2. **Basic drawing algorithms** : **(6 hrs)**
   DDA and Bresenhams line generation algorithms, DDA and Bresenhams Circle generation algo, midpoint circle algo, midpoint ellipse algo, polygon filling, seed fill and edge fill
3. **2-D transformation** : **(4 hrs)**
   translation, rotation, scaling ,matrix representation and homogeneous coordinates, composite transformation, reflection, shearing
4. **2 D viewing and clipping** : **(6 hrs)**
   viewing transformation, window to viewport coordinate transformation**. Clipping** – point clipping, line clipping, cohen Sutherland line clipping, midpoint subdivision line clippling algo, Sutherland hodgman polygon clipping algo

**Section II**

5. **3-D concepts** : **(4 hrs)**
   3d transformation, translation, rotation, scaling and matrix representation. 3-D projection - parallel projection, perspective projection

6. **Introduction to IP** : **(6 hrs)**
   what is digital image processing, fundamental steps in digital image processing, components of an image processing system, sampling and quantization, representing digital image , spatial and intensity resolution.

7. **Image enhancement and spatial filtering** : **(10 hrs)**
   basic intensity transformation functions, image negatives, log transformation power law ( gamma) transformation, piecewise – linear transformtation function, contrast streteching , intensity level streteching, bit plane searching, spatial filtering : - basics of spatial filtering, smoothing spatial filters :- smoothing linear filters, order statistics filter

**Note: Practical will consist of minimum 10 programs based on above syllabus**

**Reference Books** :


1. Computer graphics by M. Pauline Baker, Donald Hearn
2.Computer graphics :- 2nd edition , Mc Graw-Hill publication - S. Harrington
3.Rafel C. Gonzales and Richard e woods - digital image processing ( 3rd edition)
4.Computer graphics by A.D. Godse, 2nd edition TPP publicatigon


# Programming Laboratory-III (VB.Net Programming)

Lecture: 2 Hrs/Week — Practical/Oral Examination: 50 Marks
Practical: 2 Hrs/Week — Term Work: 50 Marks

**1. Introduction to Visual Programming**

Event driven programming, History of VB.Net, Features of VB.Net, Architecture of VB.Net [.Net server, framework, services etc.], .Net Framework: framework components, classes, CLR, VB.Net IDE, VB.Net: Variables, Keywords, constants, Data types, Conditional statements, looping statements, case control statements

**2. VB.NET Controls**

ActiveX controls, Forms, Controls & properties, Text Boxes, Labels, Command Button, Radio Button, Check Boxes, List Box, Combo Box, Scroll Bar, Progress Bar, Group Box, Calendar, Date Time Picker, Picture Box, Image List, Rich Text Box, Popup/Content Menus, List View Control, Tree View Box

**3. Arrays and string class**

The array class, collections, lists, string class, jagged array, array list, String class and function, OOP using .net, Classes, Objects, constructor, destructor, Methods, properties, delegates, assemblies, namespaces

**4. Inheritance, Polymorphism**

Inheritance, Single, multiple, multilevel inheritance, Polymorphism-constructor overloading, method overloading, overriding, File operation-read, write, delete.

**5. Exception Handling**

Importance of Exception Handling, Exception Handling in VB.NET, User defined exception, Exception - type of errors, structured and unstructured exception, Tracing errors: breakpoint, watch, quick watch, locals and autos

**6. ADO.Net**

Components of ADO.Net, Features of ADO.Net, Datasets, Data table, Datarow, Datacolumn, Datareader, ADO.Net programming,Report generation .

**Note: Practical will consist of minimum 15 programs based on above syllabus**

**Reference Books:**


1. VB.NET Complete Reference-Tata MacGraw Hill
2. Programming Microsoft VB.NET – Francisco Balena
3. Complete reference VB.NET by Jeffery_R_Shapiro
4. Visual Basic.NET Black Book – Steve Holzner
5. Visual Basic.NET Programming Bible – Bill Evjen
6. Beginning VB.NET- Wrox Publication

# Semester –IV

## Relational Database Management System

**Theory: 4 Hrs / Week** **Theory: 100 Marks**

**Practical: 2 Hrs / Week** **Term Work: 25 Marks**

**Section I**

**1. Entity relationship model: (5 hrs)**

Introduction, Notations, Mapping cardinality, Extended ER features, Design of ERD, Reduction of ER schema to tables.

**2. Relational models (4 hrs)**

Structure of relational database, Relational algebra, Tuple relational calculus

**3. SQL (6 hrs)**

DDL, DML, DQL, Set operations, Aggregate functions, Null values, Sub-queries, Views, Embedded SQL, Query by Example.

**4. Integrity and security (5 hrs)**

Constraints, Stored Procedures , Triggers, Encryption, Authorization in SQL, Authentication.

**Section II**

**5. Relational database design (5 hrs)**

Pitfalls in relational database design, Decomposition, Functional Dependencies, 1 NF, 2 NF, 3 NF, BCNF and $4^{th}$ NF.

**6. Storage and File structure (8 hrs)**

Overview of physical storage media, Magnetic disk, Tertiary storage, RAID, File organization, Organization of record in file, Data dictionary storage, Ordered indices and B+ tree index files, Static and dynamic hashing.

**7. Transaction and Concurrency control (4 hrs)**

Concept of transaction, ACID properties, Serializibility, States of transaction, Concurrency control, Locking techniques.

**8. Database System Architecture** **(3 hrs)**

Centralized system , Client Server System, Parallel systems, and Distributed system.

**Note: Minimum 10 practical based on above syllabus.**

**Text Book:**

1. Database system concepts by A. Silberschatz and Henry F. Korth, TMH (4thedition)

**Reference Books:**

1. Relational database theory and practicals by Val Occardi, BPB, New Delhi
2. Principals of database system by J. D. Ullman, Galgotia
3. Database design by Wiederhold, McGraw Hill
4. Relational data base system by C.J.DATE

# Operations Research

**Lecture: 4 hrs / week** **Theory: 100 Marks**

**Section I**

**1. Linear Programming and its applications:** **(8 hrs)**

Graphical solutions of two variable problems, Computational procedure of simplex method, artificial variable techniques: Big-M and Two phase simplex method, duality in L.P.P. The dual simplex method, revised simplex method. Special linear programming problems: Transportation and assignment problems.

**2. Integer Programming:** **(4 hrs)**

Gomory's cutting plane technique, Branch and Bound method

**3. Introduction to Game theory:** **(8hrs)**

Minimax, Maximin principles, two person zero sum game, pure and mixed strategies, algebraic method to solve 2 X 2 game, solution of pay-off matrices of m X 2 and 2X n order, graphical solution, principle of dominance and modified dominance property, Brown's algorithm, game theory and L.P.P.

**Section II**

**4. Queuing Theory (waiting line models)** **(6 hrs)**

Arrival distribution theorem, distribution of inter arrival times, Model I (Birth & death model) (M/M/1) : (∞ / FCFS) in detail.

**5. CPM & PERT :** **(7 hrs)**

Introduction to CPM & PERT ,Completion of events on scheduled time, examples on optimum

duration & minimum duration cost. Introduction to sequencing problem, n-jobs, two machine & three machines. Simulation & formation of Markov chains( markov analysis), simulation.

**6. Equipment Replacement: (7 hrs)**

Replacement of items whose maintenance cost increases with time & money value is constant and when money value changes with constant rate, group replacement of items that fail completely.

**Text Books :**

1. Operations research by S.D. Sharma

**Reference books :**

1. Operations research by kantiswaroop
2. Introduction to Operations Research : Billey E Gillet TMH
3. Optimization theory : S.S. Rao & Wiley.
4. Introduction to probability and queuing theory for engines: Kishore Trivedi
5. LP & N/W model : S.K. Gupta, EWF
6. Operations Research : Taha

# Design and Analysis of Algorithm

**Lecture: 4 Hrs / week** **Theory: 100 Marks**

**Section I**

**1. Introduction (4 hrs)**

What is an algorithm? Algorithm specification, performance analysis, asymptotic notations (Definitions and Theorems), randomize algorithm (Probability theory, Informal description)

**2. Divide and conquer (4 hrs)**

General method, Recursive and Iterative method (finding maximum and minimum, merge sort, quick sort, and binary search), and STRASSEN's matrix multiplication, convex hull (Graham's Scan and Quick Hull).

**3.The Greedy method (6 hrs )**

KNAPSACK problem(with fractional Weights), tree vertex splitting, job sequencing with deadlines, optimal merge patterns , single source shortest paths.

**4. Dynamic programming (6 hrs)**

Multistage graphs, All pairs shortest path, optimal binary search trees(computation of c,w,r), string edition, 0/1KNAPSACK, reliability design, traveling salesman problem, flow shop scheduling.

**Section II**

**5. Basic traversal and search techniques** **(6 hrs)**

Techniques for binary trees, Breadth first, Depth first search(with Algorithms), connected components and spanning trees, bi connected components and DFS, Scheme to Construct a Bi-connected graph

**6. Back Tracking** **(4 hrs)**

The 8 Queen's problem, sum of subsets, Graph coloring, KNAPSACK problem

**7. Branch and bound** **(4 hrs)**

The method, 0/1 KNAPSACK problem, Traveling salesperson's problem, Efficiency considerations

8. **Algebraic problems** **(6 hrs)**

The general methods, evaluation and interpolation, the FFT (primitive $n^{th}$ root of unity) modular arithmetic (finding value of k) even faster evaluation and interpolation.

**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 Wesely and company

2. Design of data structure and algorithm by Van Amstal and Printevs, PHI

# Programming in Java

**Lecture: 4 Hrs/ Week** **Term Work : 50 Marks**
**Practical: 2 Hrs / Week**

**Section I**

**1. Introduction** **(6 hrs)**

1.1 Introduction to Java Programming Language
1.2 Objects and Classes
1.3 Inheritance, Abstract Classes and Interface
1.4 Uses of final and String functions
1.5 Packages
1.6 Exception handling

**2. Applet as Java applications** **(2 hrs)**

2.1 Introduction
2.2 Creating an Applet
2.3 Displaying Applets Using Web Browser and Applet viewer

2.4 Comparison of Applet and Application

**3. Multithreaded Programming (4 hrs)**

3.1 Multithreading Concepts.
3.2 Thread Lifecycle.
3.3 Creating Multithreaded Application
3.4 Thread Priorities.
3.5 Thread Synchronization
3.6 Inter-Thread Communication

**4. AWT and Java Input Output (8 hrs)**

4.1 Components (Label,TextField,Button,Checkbox,List and Scrollbar)
4.2 Layout Managers
4.3 Listeners(Action,Text,Item,Key,Mouse,MouseMotion and Adjustment)
4.4 File Reader and Writer
4.5 FileInputStream and FileOutputStream
4.6 File Dialog(Open and Save)

**Section II**

**5.Introduction to Swing : (5 hrs)**

5.1 Swing Controls**(**Icons,Labels, Buttons , Text Boxes, ComboBoxes, Tabbed Panes,Scroll Panes)
5.2 Panels and Tables
5.3 Differences between AWT & Swing

**6. Networking with Java (5 hrs)**

6.1 Networking basics
6.2 Java.net- Networking classes and Interfaces
6.3 Implementing TCP/IP based Server and Client
6.4 Datagram Server and Client.
6.5 URL Connections

**7. JDBC (6 hrs)**

7.1 Introduction
7.2 Writing first JDBC Application
7.3 Types of Statement Objects
7.4 Types of ResultSet
7.5 Metadata

**8. RMI (4 hrs)**

8.1 Introduction and Architecture
8.2 Writing RMI application
8.3 Introduction to CORBA

**Note: Practical will consist of minimum 10 programs based on above syllabus.**

**Text Books:**

1. The Complete Reference By Herbert Schildt
2. Core Java(Volume-II) By Cay.S.Horstmann and Gary Comell

**Reference Books:**

1. Java Swing, Loy M, Shroff Publisher
2. Java 6 Programming, Black Book
3. Java Projects, BPB Publication

# Elective - I
# Software Testing and Quality Assurance

**Theory: 4 Hrs/ week** **Theory: 100 Marks**

**Section I**

**1. Quality Concept (8 hrs)**

Definition of Quality, QA, SQA, Quality factors, Software Quality Metrics, Process Improvement:- Process and Product Quality, The SEI Process Capability Maturity Model, ISO, Six-sigma, Process classification

**2. Software Quality Assurance (4 hrs)**

Need for SQA, SQA Activities, Building blocks of SQA, SQA Planning and Standards

**3. Software Reliability (2 hrs)**

Reliability Measures, Reliability Models

**4. Verification and Validation (6 hrs)**

Verification and validation Concepts, Verification and validation planning, Software Inspections, Automated Static Analysis, Cleanroom Software Development

**Section II**

**5. Software Testing Fundamentals (4 hrs)**

Testing Objectives, How test information Flows?, Testing Lifecycle, Test Cases:- What it is? Test Case format and example.

**6. Levels and Types of Testing (6 hrs)**

Unit Testing, Integration Testing, System Testing, Acceptance Testing, Manual Vs Automatic Testing, Testers Workbench, Installation Testing, Usability Testing, Regression Testing, Performance Testing, Security Testing

**7. Static and Dynamic Testing (6 hrs)**

Static Testing Vs Dynamic Testing, Review Types, Review Meeting, Review Reporting and Record keeping, Review guidelines and Review checklist, Data Flow Analysis, Control Flow Analysis- Forward and Backward, Cyclomatic Complexity Analysis and Example.

**8. Black Box and White Box Testing (4 hrs )**

Functional Testing (Black Box):- Equivalence Partitioning, BVA, Cause Effect Graphing, Syntax Testing, Structural Testing (White Box) Coverage Testing, Statements Coverage, Branch and

decision coverage, Path Coverage, Validation Testing Activities:- Low Level Testing, High Level Testing, Introduction to CAST (Computer Aided Software Testing Tools)

## Reference Books:


1. Quality Software Management By Wevinberg
2. S/W Quality Engineering By Kann
3. Software Engineering By Pressman
4. An Integrated approach to S/W Engineering By Pankaj Jalote
5. Software Testing in Real World Edward Kit, Pearson Pub


# UNIX Operating System

**Lecture: 4 hrs/week** **Theory:100 Marks**

**Section I**

**1. Overview of Unix Operating System (4 hrs)**

System structure, User perspective: file system, processing environment, building block primitives, Operating system services, Architecture of UNIX OS, Introduction to system concepts: Overview of File subsystem, processes, sleep and wakeup, System administration.

**2. Files (8 hrs)**

Buffer headers, Structure of buffer pool, Reading a disk block: algorithm bread, Writing a disk block: algorithm bwrite, Inodes: definition, accessing inodes, releasing inodes, Structure of regular file: Direct and indirect blocks in inode, Directories, Super block, Allocation of disk blocks: algorithm alloc.

**3. System calls (8 hrs)**

Open, Read, Write, File and record locking, lseek system call, Close, File creation, Change directory and change root, Change owner and change mode, Pipes: pipe system call, opening a named pipe, reading and writing pipes, closing pipes.

**Section II**

**4. Process, Process control and scheduling (6 hrs)**

Process states and transitions, Layout of system memory: regions, pages and page tables, The context of a process.

Process creation: algorithm fork, Process termination, Awaiting process termination, Invoking other programs: algorithm exec, The user ID of the process, Changing the size of a process, The shell, System boot and the init process, Process scheduling: algorithm schedule_process, scheduling parameters.

**5. Memory management policies** **(4 hrs)**
Swapping: allocation of swap space, swapping processes out, swapping processes in, algorithm swapper, Demand paging: data structures for demand paging, the page-stealer process.

**6. The I/O sub-system** **(6 hrs)**
Driver interfaces: system configuration, algorithm open, algorithm close, Disk drivers, Terminal drivers: clists, Streams.

**7. Inter process communication** **(4 hrs)**
Process tracing, System V IPC, Sockets.

**Text Book:**
The design of the UNIX operating system – Maurice.J.Bach(PHI)

**Reference Books:**
1. Unix internals : The new frontiers – Uresh Vahalia (Pearson)

2. Operating system design and implementation – A.S.Tanenbaum, PHI

# Object Oriented Analysis and Design

**Lecture : 4 hrs/week** **Theory : 100 marks**

**SECTION – I**

1) **Introduction:** **(4hrs)**
   Introduction to OMG standards, OMG approval for UML, History of UML, Architecture, Rational unified process, Object oriented concept review.
2) **Fractional View:** **(8hrs)**
   Use case diagrams - use cases, actors, guideline for use case models, Relation between use cases – extend, include, and generalize.
   Activity diagrams: elements of activity diagrams – action state, activity state, control and object flow, Transitions (merge, fork, join), Activity diagram, Partition-swim lanes
3) **Structural Modeling Using UML :** **(8hrs)**
   Classes, Relationships- dependency, associations, generalizations, aggregations, common mechanisms, things, class diagrams, interfaces, types and roles, packages, instances, object diagram.

**SECTION - II**

4) **Behavioral (Dynamic Structure):** **(10hrs)**
   State diagram – state diagram notation, events,( signal, time, change).

State machine.

Interaction diagram: Sequence diagram-sequence diagram notations, iterations, conditional messaging, branching, object creation and destruction, example.

Collaboration diagram: collaboration diagram notation, iterations, conditional messaging, branching, object creation and destruction, example.

5) **Architectural Modeling: ( 10hrs)**

Deployment diagram notation, nodes, object migration between nodes,

Process architecture- process threads and their notation, objection synchronization,

Implementation architecture- Component diagram and their notation, examples.

**Text Books:**


1. The Unified modeling language user guide – Grady Booch
2. James Ram Baugh, I var Jacobson ( Addison Wesley)


**Reference Books:**


1) Practical object oriented design with UML- Mark Priestely
2) UML in nut Shell- Sinon Alhair

# Programming Laboratory - IV

# (Web Design Technique)

**Lectures: 2Hrs/week** **Tutorial: 2 hrs/week** **Term work: 50 marks**

**Practical: 2 Hrs/week** **Practical Oral Examination: 50 marks**

## Section-I

### 1. Introduction to HTML

1.1 World Wide Web
1.2 Web Publishing
1.3 Physical & logical HTML
1.4 HTML <body> tag
1.5 HTML Text formatting tags
1.6 Ordered and unordered List tags : < ol>, <ul>, <li> , <dl>, <dt>, <dd>
1.7 Inserting image : <img> Tag
1.8 HTML Links : text, image and image mapping
1.9 Tables
1.10 Frames
1.11 HTML Forms: controls and validations

### 2. Cascading Style Sheet

2.1 Introduction to CSS
2.2 Types of style sheets
2.3 Text formatting properties
2.4 CSS Borders
2.5 Margin Properties
2.6 Color properties
2.7 Use of  and  tag
2.8 Use of classes in CSS with an example

### 3. JavaScript

3.1 Concept of script, Types of Scripts, Introduction to javascript
3.2 Variables, identifiers constants in JavaScript and examples of each.
3.3 Operators in JavaScript's, various types of JavaScript operators Examples on JavaScript operators,
3.4 Control and looping structure, Examples on control and looping structures (if, if…else, for, while, do while, switch,etc….)
3.5 Concept of array, how to use it in JavaScript , types of an array, examples ,methods of an array, with examples

3.6 Event handling in JavaScript with examples
3.7 Math and date object and examples on it.
3.8 String object and examples on it, and some predefined functions
3.9 DOM concept in JavaScript, DOM objects Window navigator, History object and its methods, Location object with methods and examples
3.10 Validations in JavaScript, some examples on it. Some form validation programs

**Section-II**

4**. jQuery& AJAX**

4.1 Introduction to jQuery, Syntax Overview
4.2 Anatomy of a jQuery Script, Creating first jQuery script
4.3 Traversing the DOM, Selecting Elements with jQuery,
4.4 Refining & Filtering Selections, Selecting Form Elements
4.5 Working with Selections - Chaining, Getters & Setters
4.6 CSS, Styling, & Dimensions
4.7 Manipulating Elements - Getting and Setting Information about Elements, Moving, Copying, and Removing Elements, Creating New Elements
4.8 Manipulating Attributes, Utility Methods Events - Connecting Event to Elements, Namespacing Events, Event handling,Triggering Event handlers, Event Delegation Animating effects - animate(), click(), hover(), toggle()
4.9 Plugins - Create a basic plugin, Finding & Evaluating Plugins, Writing Plugins, Tabs, Panels and Panes examples
4.10 jQuery UI and Forms
4.11 AJAX Overview, jQuery's AJAX related methods, Ajax and Forms, Ajax Events,

5. **XML**

5.1 Concept of XML,features of XML
5.2 Writing XML elements, attributes , etc.
5.3 XML with CSS, programs on it.
5.4 XML with DSO, programs on it.
5.5 XML Namespace, XML DTD, programs on it.
5.6 XML schemas, writing simple sheet using XSLT
5.7 SAX Parser, DOM Parser
5.8 Introduction to SOAP, Examples on XML

6**. Web Server**

6.1 Concept of Web Server, Obtaining and Installing Apache Http Server on Windows
6.2 Editing httpd.conf configuration file, Configuration directives in httpd.conf -ServerRoot, PidFile, ServerName,
6.3 Add site to /etc/hosts file, DocumentRoot, ErrorLog, Listen, Directory, Files, Location,

**Note: Practical will consist of minimum 15 programs based on above syllabus**

**Reference Books:**


1. Complete reference HTML, TMH, 4th Ed.
2. HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross, BPB Pub, 3rd Ed.
3. Web enabled commercial application development using HTML, DHTML, JavaScript, PERLCGI, BPB Pub,3rd Ed.
4. Programming the World Wide Web Robert W. Sebesta,Pearson,4th Ed.
5. JavaScript Bible, Wiley Pub.
6. Learning jQuery - Jonathan Chaffer, Karl Swedberg
7. Professional Ajax, 2nd Edition Wrox Press
8. Apache Server 2.0: The Complete Reference - Ryan B. Bloom, TMH Pub.
9. Apache HTTP Server Reference Manual - for Apache version 2.2.17 – Apache Software Foundation
10. Internet Technology at work Hofstetter fred, TMH.
11. Beginning XML Wrox Press
12. XML how to program Deitel & Deitel, Pearson Pub.


Reference Sites:

1. http://www.w3schools.com

2. http://www.apache.org

# Equivalence for FYMCA (Under Engg.) Year 2013-14

| Sr. No. | Old Syllabus | New Syllabus |
|---|---|---|
| 1 | Sem- I: Discete Mathematical Structure | Sem- I Discete Mathematical Structure |
| 2 | Sem- I Fundamental of Computer and 'C' | Sem- I Fundamental of Computers |
| 3 | Sem- I Digital Electronics | Sem- I Digital Electronics |
| 4 | Sem-I :Computer Oriented Numerical Statistics | Sem-II :Computer Oriented Numerical Statistics |
| 5 | Sem- I Industrial Management and Organizational Behaviour | Sem- I Principles of Management and Organizational Behaviour |
| 6 | Sem- I Programming Lab- I | Sem- I Programming Lab- I |
| 7 | Sem- II Computer Oriented Operation Research | Sem- II Operating System |
| 8 | Sem- II Unified Modeling Language | Sem- II Object Oriented Programming using C++ |
| 9 | Sem- II Data Structure | Sem- I Programming in 'C' |
| 10 | Sem- II Microprocessor | Sem- II Microprocessor |
| 11 | Sem- II Software Engineering | Sem- II Software Engineering |
| 12 | Sem- II Programming Lab -II | Sem- II Programming Lab –II |
| 13 | Sem- I Seminar - I | Sem- I Seminar – I |
| 14 | Sem- II Seminar - II | Sem- II Project |