Shivaji University, Kolhapur

SYLLIBUS/ STRUCTURE (REVISED from **June- 2009**)
T.E. Information Technology (Semester – V & VI)

Semester – V

Sr. no	Subjects	L	T	P	Theory Marks	T/W	OE	POE	Total Marks
1	Operating System-I	3	-	2	100	25	25	-	150
2	Computer Networks	4	-	2	100	25	-	50	175
3	Object Oriented Modeling and Design	3	-	2	100	25	-	-	125
4	System Softwares	3	-	-	100	-	-	-	100
5	Organizational Management and Behavior.	3	-	-	100	-	-	-	100
6	Application Development Tool-I	2	-	4	-	25	-	50	75
7	Mini-project-III	-	-	2	-	25	-	-	25
	Total	**18**	**-**	**12**	**500**	**125**	**25**	**100**	**750**

Semester – VI

Sr. no	Subjects	L	T	P	Theory Marks	T/W	OE	POE	Total Marks
1	Database Engineering	4	-	2	100	25	-	50	175
2	Operating System-II	4	-	-	100	-	-	-	100
3	Software Testing and Quality Assurance	3	-	-	100	-	-	-	100
4	Internet Technology	4	-	2	100	25	-	50	175
5	Information System Security	3	-	-	100	-	-	-	100
6	Application Development Tool-II	2	-	4	-	25	25	-	50
7	Soft skills	-	2	2	-	25	25	-	50
	Total	**20**	**2**	**10**	**500**	**100**	**50**	**100**	**750**

Note:
1. The term work as prescribed in the syllabus is to be periodically and jointly assessed by a team of teachers from the concerned department.

2. In case of tutorials, students of different batches be assigned problems of different types and be guided for the solution of the problem during tutorial session. Problems thus solved be translated into computer programs wherever applicable and executed by respective batches during practical session.
3. The assignments of tutorials and practicals need to be submitted in the form of soft copy and / or written journal.
4. Breakup of term work marks shall be as follows:

- Mid-semester test – 5 marks.
- End-semester test – 5 marks.
- Tutorial assignments and / or practical performance – 15 marks.

TE (Information Technology) Semester - V
1. Operating Systems – I

Lecture : 3 hrs/week

Practical : 2 hrs/week

Theory: 100 Marks

T/W : 25 Marks

OE : 25 Marks

SECTION - I

1. Introduction:

What is an operating system?, Types of Operating System-Batch operating systems, Multiprogramming operating system , Time sharing systems, Real time system, Parallel system, Distributed system Different views of operating systems-Command language use 's' view of operating system, system call user 's' view's of the operating system. **(4)**

2. Process Management:

Process Concept, Process Scheduling, operating system service for process management – CREATE, DELETE, ABROT, SUSPEND, RESUME, DELAY. etc., Cooperating process, Threads, Inter-process Communication (Algorithms evaluation). **(4)**

3. Process Scheduling:

Basic concept ,Scheduling Criteria , Types of scheduling Long terms medium term and short term scheduler, Scheduling Algorithms, Multiple processor scheduling , Real time scheduling. **(4)**

4. Inter process Synchronization & Communication:

Background , Classical problems of synchronization , Critical Region , The critical section problem , Synchronization Hardware, Mutual exclusion ,Semaphores, Producers / consumer problem, producer and consumers with an unbounded buffer, producer and consumer with a bounded buffer, Monitors, messages. **(6)**

SECTION – II

5. Memory Management:

Background, Logical Versus Physical Address space, Swapping Contiguous Allocation, Paging, Segmentation , Segmentation with paging. **(6)**

6. Virtual Memory:

Background, Demand paging, Page replacement, Page replacement algorithms, Allocation of frames, Thrashing(Only concept), Demand segmentation. **(6)**

7. Input / Output:

The input /output problem- asynchronous operation, speed gap: CPU v/s Peripherals, input –output interface –buffer register, command register, status I/O port examples, USART, PIT, Program controlled I/O – Controlling a single device and controlling multiple devices, Interrupt driven I/O- controlling a single device and multiple device concurrent I/O.   **(6)**

Text Books:

1. Operating Systems – concepts and design –Milan Milenkovic (TMGH)
2. Operating system Concepts – Silberschatz Galvin

Reference Book:

1. Operating Systems – Madnick Domnovan (MGH)
2. Operating system-K.S.Sumitradevi,N.P.Banashree (SPD Publication)
3. Operating Systems concepts – James Peter.
4. Operating Systems Design and Implementation – Tanenbaum (PHI)
5. Unix system - B Morgan.
6. A practical Guide to Unix system V – Mark G. Sobell (Benjamin /cummings Pub.)

Term Work:

It should consist of 10 experiment of implementation on the above mentioned topics based on UNIX operating system.

Proposed List of Experiment :

1. Study of Unix Operating System
2. Study & Implementation of General Utilities , Directory & File Utilities
3. Study & Implementation of File Security & Text Manipulation Utility sed, awk, grep
4. Study & Implementation of building block primitive like redirect I/O and pipe
5. Implementation of Scheduling Algorithms.
6. Study & Implementation of process related utilities
7. Study & implementation of Producers / consumer problem
8. Study & implementation of utilities for the advanced system administrator

Like useradd, passwd, df, du, find, fdisk, mkfs

9. Study & implementation of Shell programming

10. Study of system startup & init

11. Unix Commands

12. Multithreading (Chat application)

13. Implementation of scheduling algorithms

14. Semaphore implementation

15. Implementation of IPC using message

16. Implementation of IPC using shared memory

17. Producer-consumer problem for bounding and unbinding buffer

18. Memory allocation algorithm (best-fit, first-fit, worst-fit).

• TE (Information Technology) Semester - V

2. Computer Networks

Lecture   **:** 4 hrs/week   **Theory**   **:** 100 Marks
Practical   **:** 2 hrs/week   **T/W**   **:** 25 Marks
                                                                                  POE   **:** 50 Marks

SECTION-I

1. Introduction to Computer Network: (2)
Overview of OSI layer Model and TCP/IP protocol model, Addressing, Underlying technologies for LANs, WANs, and Switched WANs.

2. Data Link Layer   (6)
Design issues for Data Link Layers, Framing methods, Error control: detection and correction, Flow control, Elementary Data Link protocols, Sliding window Protocols, Go back n, Selective repeat.

3. Medium Access Control Sub layer: (6)
Static and Dynamic channel allocation, Multiple Access protocols ALHOA, CSMA, Collision Free Protocols, Ethernet: IEEE 802.3, IEEE 802.4, IEEE 802.5 standards, Wireless LANS 802.11 standards

4. Network Layer: (8)
IPv4 Addresses: Classful Addressing Other Issues, Sub-netting and Super netting, Class less Addressing, Delivery, Forwarding and routing; **Routing methods**: Shortest path, Link state, Distance vector routing and broadcast routing, **Congestion control algorithms**: Principles, Congestion prevention policies, congestion control in datagram subnet, Load Shedding, Jitter Control.

SECTION -II

5. Internet Protocol: (8)
 IP Data gram format, Fragmentation and reassembly models, ARP, RARP, ICMP, IGMP

6. Transport Layer: (8)
The Transport service primitives,
UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP.
TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error
control in TCP, TCP Timers; **Berkeley Sockets:** Socket Addresses, Elementary Socket system
calls byte ordering and address conversion routines, connectionless iterative server, connection
oriented concurrent server, TCP and UDP Client server Programs.

7. Routing Protocols: (3)
   Introduction and background,RIP OSPF, BGP.

8. The Application layer: (3)
   DNS, Electronic Mail, WWW, Multimedia

Text Books:

1. TCP/IP protocol suit – Behrouz A. Forouzen (Tata Mag. Hill)
2. Computer Networks – Andrew S. Tanenbaum (PHI)
3. Unix Network Programming – W. Richard Stevens (PHI)

Reference Books:

1. TCP/IP Illustrated, The Protocols, Vol. I – W. Richard Stevens, G. Gabrani (Pearson
   Education.)
2. Internetworking with TCP/IP, Vol. I, Principles, Protocols, and Architectures (4th Ed.) –
   D. E. Comer (Pearson Ed.)
3. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Applications
   (2nd Ed.) – D. E. Comer, David L. Stevens (Pearson Ed.)

Term Work: It should consist of 10-12 experiments based on the syllabus and should be
implemented **by using Socket Programming.** The study experiments should consist of some
practical work and observations.

 Set of assignments is listed below:

1. Study and demo of LAN, WAN and various connecting devices and components
   List out component and devices required for a std. LAN, WAN
2. Study, design and configuration of IEEE 802.3 Ethernet and IEEE 802.11 Wireless
   LANs (Referring RFCs)
3. Study of following connectivity test tools with all its options –
   - ifconfig, arp, route, traceroute
   - nmap, netstat, finger
4. Implementing Framing methods
5. Implementing Elementary data link protocol (Stop & wait protocol)
6. Implementation of Error correction and Error detection codes
7. Program to understand IP addressing, classful & classless addressing.

8. Implementation of sliding window protocol.
9. Implement shortest path routing algorithm
10. Programs for connection oriented (TCP) client-server using socket programming
11. Programs for connection less (UDP) client-server using socket programming
12. Study of network protocol analyzer (Ethereal or Wire-Shark) and understanding packet formats for UDP, TCP, ARP, ICMP protocols.

• TE (Information Technology) Semester - V

3. Object Oriented Modeling & Design

Lectures : 3 hrs/week **Theory** : 100 Marks
Practicals : 2 hrs/week **T/W** : 25 Marks

SECTION – I

1. Introduction:

Object Oriented development & themes, evidence for usefulness, modeling as a Design Technique. **(2)**

2. Object Modeling:

Objects, classes, links and associations, generalization and inheritance, grouping Constructs, aggregation, abstract classes, generalization as extension and restriction, multiple inheritance, metadata, candidate keys and inheritance. **(5)**

3. Dynamic & Functional Modeling:

Events, states, operations, concurrency, nested state diagrams, advanced dynamic modeling concepts, relation of object and dynamic models, DFD, relation of functional to object and dynamic models **(4)**

4. Design Methodology:

Preview of OMT technology, Impact of an object oriented approach, Analysis, System design with examples, Combining models, Designing models, Designing algorithms, Optimization of design, control. Associations, Physical packaging, Comparing methodologies using structure analysis and design, Jackson's structured development Information modeling notation and object oriented works. **(7)**

5. **Implementation of OMT:**

   Use of programming language and database system, Object oriented style, feature of object-oriented languages, Applications of OMT like object diagram compiler, Computer animation,   Electrical distribution design system.   **(4)**

6. **Structural Modeling using UML:**

   Classes, Relationships, Common mechanisms. Diagrams, Class Diagrams, Interfaces, Types and Roles, Packages, Instances and Object Diagram   **(4)**

7. **Behavioral Modeling using UML:**

   Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events and signals, State Machines, Processes and Threads, Time and space, State chart diagrams.   **(5)**

8. **Architectural Modeling using UML:**

   Components, Deployment, Collaboration, Patterns and Frame works, Component diagrams and Deployment Diagrams.   **(5)**

Text Books:

   1. Object Oriented Modeling and Design - Rambaugh, Premerlani, Eddy, Lorenson (PHI)
   2. The Unified Modeling Language User Guide - Grady Booch, Jeams Rambaugh, Ivar Jacotson (Addison Wesley)

References:

   1. Object Oriented Analysis and Design – Andrew High (TMG)
   2. Practical Object Oriented Design with UML – Mark Priestley.
   3. Object oriented Analysis & design – Kahate (TMH)

Term Work:

   Term Work should be based on Mini Project Development on real world problem using object oriented modeling tools. Use of Open source tools should be preferred.

• TE (Information Technology) Semester - V
4. System Softwares

Lecture **:** 3 Hrs/Week   **Theory :** 100 marks

<u>**SECTION – I**</u>

1. **Language Processors:**

   Introduction, language processing activities, Fundamentals of language processing, Fundamentals of language, Specification, language Processor development tools.   **(6)**

2. **Assemblers:**

   Elements of assembly language programming, A simple assembly scheme, Pass structure of assemblers, design of a two pass assembler, A single pass assembler for IBM PC.   **(6)**

3. **Macros and Macro Processors:**

   Macro definition and call, Macro Expansion, Nested macro calls, Advanced macro facilities, Design of macro preprocessor.   **(5)**

<u>**SECTION – II**</u>

1. **Compilers and Interpreters:**

   Input & Lexical Analysis, Context free grammars, top-down parsing, bottom-up arsing, code generation, memory allocation, compilation of expressions, compilation of control structures, code optimization, Interpreters.   **(7)**

2. **Linker and Loader :**

   Relocation and linking concepts, design of a linker, Self-relocating programs, A linker for MS DOS, Linking for overlays, Loaders.   **(6)**

3. **Open Source Softwares :**

   gcc, gdb, ddd, lex and yacc.   **(5)**

<u>**Text books :**</u>

1. System Programming & operating systems – 2nd Edition D.M. Dhamdhere (TMGH)
2. System Programming -- J. J. Donovan (Mc-Graw Hill)

3. Compilers - Principles, Techniques and Tools - A.V. Aho, R. Shethi and J.D.Ullman (Pearson Education.)

• TE (Information Technology) Semester - V
5. Organizational Management & Behavior

Lectures : 3 Hrs/Week   **Theory** : 100 Marks

SECTION – I

1. Functions of Management:

Definition of Management, Management environment, Planning – Need, Objectives, Strategy, Policies, Procedures, Levels Planning, Decision making, Forecasting, Organizing - Principles of Organization, Departmentation, Organizational relationship, Authority, responsibility, Delegation, Span of control, Leading - Communication process, barriers, Remedies, Motivation, Importance, Theories, Herzbergs theory, Maslow's theory, McGragers Theory, Leadership Style, Controlling – Process, Requirements for control. **(5)**

2. Operation & financial Management:

Definition of operation management, nature & scope plant, location, layout and quality control, Sources of Finance, Financial Institutions, Financial Statements, Balance Sheet and P. & L. Account (Contents only) Use & Importance, Elements of Cost, Allocation of Overheads, Costing Techniques (Elementary treatment only) Break-even analysis and its applications. **(5)**

3. Marketing & Material Management:

Marketing Concept - Objectives, types of markets, Market segmentation, Marketing Strategies – 4 AP's of Marketing, Market Research, Salesmanship, Advertising, Scope and Objectives of material management, Purchasing – Procedure, Policies, Vender Selection and rating, Stores Management, Inventory Control- Nature of Scope, ABC Analysis, VED analysis, EOQ & Various Levels. **(4)**

4. TQM & ISO.

Strategies, policies & Strategic MGT. Quality Audit, Quality function Diplomat, Six-sigma, CMM level. **(4)**

SECTION – II

5. Organization Behavior:

Managing self competency communication competency ethics and culture, Team competency Preparation and attribution-perception process selection Organization

attributions, Motivation Process concept and process models of Motivation performance goal setting and reward systems. Work Stress-nature Source efforts Stress management. **(4)**

6. **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. **(4)**

7. **Organizational Design :**

Key factors mechanistic and organic system types information processing Factors functional design product, Matrix organization network organization, Communications. **(4)**

8. **Organizational Culture:**

Elements of a culture types pf compact culture performance of organizational Culture diversity organizational socialization organizational change resistance to change, change management ethical issues, Controlling and Evaluation in Organization. **(6)**

Text Books:

1. Essential of management –Koontz and O'Donell.
2. Organizational Behavior (9th Edition) –Don Helriegel, John slocum Richard Wodman South Western –Thomson Learning

Reference Books:

1. Organizational Behavior – Fred Luthans
2. Organizational Behavior- Staphen robbins
3. Marketing Management –Philip Kotler(PHI).
4. Industrial Engineering and Management.- O.P.Khanna
5. Total Quality Management H. Lal.
6. Personal And Material Management –Rama Swami
7. Operations And Production Management- Patel Chunnawala.
8. Human Resource Management Ashwathappa
9. Human behavior at work –Keith Davis

• TE (Information Technology) Semester - V

6. Application Development Tool-I

Lecture **:** 2 hrs/week   **Term work** **:** 25 Marks
Practical **:** 4 hrs/week   **POE**   **:** 50 Marks

1. **Introduction of JAVA Language:**

   Overview of Java, Difference between C++ & Java, Java buzzwords, Data Types, Variables, type conversion & casting, Arrays, Operators & Control Statement.   **(2)**

2. **Classes & Methods:**

   Classes fundamentals, Objects & object reference, Methods, Constructer, Garbage Collection, Overloading methods & constructor, Nested & inner classes, String Class, Use of Command argument.   **(3)**

3. **Inheritance, Packages & Interfaces:**

   Inheritance, Super class, Abstract Classes, Packages, Interfaces.   **(3)**

4. **Exception Handling & Multithreading:**

   Exception Handling fundamentals, Types of exception, try, catch, throw, throws, finally statements. Java thread model priority's , synchronization, messaging creating multiple threads, Inter threaded communication suspending, resuming & stopping threads.   **(2)**

5. **I/O Basics:**

   Reading & Writing console I/O, PrintWriter Class, Reading & Writing Files.   **(2)**

6. **Applet, AWT, Frame:**

   Applet-Basic, Architecture, Applet Class, Life Cycle of Applet. AWT Classes, Windows fundamentals, Working with frame window, AWT Controls-Labels, Button, Checkbox, CheckBoxGroup, Choice, Lists, Scrollbar, TextField, TextArea, Menu, DialogBox. Swing Controls.   **(5)**

7. **Event Handling:**

   Event Classes, Event Listener Interfaces.   **(2)**

8. **Layout Managers.**

   FlowLayOut, BorderLayOut, GridLayOut, CardLayOut.   **(1)**

9. **Database Connectivity.**

   Basic design of JDBC,JDBC Programming Concepts, Executing Queries.   **(1)**

10. Networking.

Introduction of Socket, ServerSocket. **(1)**

Text Books:

1. Complete Reference JAVA 2 - Herbert Schildt. (TMGH)
2. Core Java 2 volume II –Advanced Features.

    - Cay S. Horstmaan, gary Cornell –Pearson.

Reference Books:

1. Learning Java - Niemeyer & Knudsen – O'REILLY (SPD)

Term work: It should consist of minimum 14 practical assignments based on above topics. Minimum one assignment on each topic.

• TE (Information Technology) Semester - V

7. Mini Project-III

Practical   **:** 2 hrs/week   **Term work**   **:** 25 Marks

Three or Four students (Maximum) in a group will carryout a mini project.

A batch of practical / tutorial should be divided into mini project groups. The faculty should guide the project group for selection of the topic and the work to be done. The mini project should consist of defining the problem, analyzing, designing the solution and implementing it using a suitable programming language or tool. A presentation based on the above work is to be given by the group at the end of the semester. The work will be jointly assessed by a team of teachers of the department. A hard copy of project report of the work done is to be submitted along with the project software CD to the department.

TE (Information Technology) Semester - VI

1. Database Engineering

Lectures : 4 Hrs/Week   **Theory**   **:** 100 Marks
Practical: 2 Hrs/Week   **T.W**   **:** 25 Marks
                                          POE   **:** 50 Marks

SECTION – I

1. Introduction:

Purpose of Database Systems, Data abstraction, Data Models, Overall System Design, Entities and Entity sets, Mapping Constraints, E-R Diagram, Reducing E-R Diagrams to Tables, Generalization, and Aggregation. **(4)**

2. Relational Model:

Structure of Relational Databases, the Relational Algebra, the Tuple Relational Calculus, Structured Query Language (SQL), PL/SQL – Stored Procedures, functions, trigger, cursor. **(7)**

3. Integrity Constraints and Design:

Domain Constraints, Referential Integrity, Functional Dependencies, Canonical cover, Pitfalls in Relational database Design, Decomposition and Normalization using Functional Dependencies. **(7)**

4. Storage and File Structure:

Physical storage media, Magnetic Disk, RAID, Tertiary storage, Storage access, File Organization, Organization of Records in Files, Data Dictionary Storage. **(4)**

SECTION – II

1. Indexing and Hashing:

Basic Concepts, Indexing, B+ Tree Index Files, B-Tree Index Files, Static Hash Functions, Dynamic Hash Functions, Comparison of Indexing And Hashing, Multiple Key Access. **(5)**

2. Query Processing:

Overview (Query Interpretation), Catalog Information for cost estimation, Measure of Query cost, Selection operation, sorting, Join operation, Transformation of relational expression. **(5)**

3. Concurrency Control:

Transaction concept, Transaction state, Concurrent Executions, Serializability, Testing for Serializability, Lock-Based Protocols, Graph based Protocols, Time-Stamp Based Protocols, Validation Techniques and Multiple Granularity. **(8)**

4. Crash Recovery:

Failure Classification, The storage structure, Log-Based Recovery, Buffer Management, Checkpoints, Shadow Paging. **(4)**

Text Book:

1. DataBase System Concept by Henry F. Korth, Abraham Silberschatz, Sudarshan (McGraw Hill Inc.) Fourth Edition
2. Database Management System – Ram Krishnan

Reference Books:

1. Principles of DataBase Systems by J.D. Ullman (Galgotia Publications)
2. DataBase Design by Wiederhold (McGraw Hill Inc.)
3. Fundamentals of Database Systems – Masri and Navathe (Bengamin Cummings, 1989).
4. Database design, application development & administration – Michael V.
5. Mannino(MGH- International Edition).

Term Work :

▪ It should consist of minimum 8 experiments based on above topics and should be implemented as per the note given below.

Set of assignments is listed below:

1. Study of ER model.
2. Study of DDL & DML.
   Basic SQL structure-select, from, where clause.
   Create table, alter, update, delete, insert, and rename commands.

Queries based on above commands.

3. String, Set operations, aggregate functions, Group by, Order by clause.

   Queries based on above commands.

4. Database joins- equijoin, inner join, outer joins & View creation.

   Queries based on above commands.

5. Constraints – creating table using all constraints (primary key, foreign key

   Not null, unique, check, on delete clause).

   Queries based on above commands.

6. Study of Functional dependency & Canonical Cover.

   Implementation of closure of Functional dependencies and canonical cover.

7. Study of Normalization & Normal forms.

8. Basics of PL/SQL – Cursors.

9. Trigger: Implement trigger using before & after clause.

10. PL/SQL Procedures, functions.

11. Indexing & Hashing.

    ▪ Implementation of dense and sparse index.

    ▪ Implementation of static and dynamic hashing.

12. Concurrency Control

    Write program to simulate any one concurrency control Protocol.

13. Implementation of student database using JDBC-ODBC

Note:

   ▪ Experiment no. 2 to 5 & 8 to 10 should be implemented using RDBMS Package.

   Remaining experiments should be implemented using Java without using RDBMS Package.

TE (Information Technology) Semester - VI

2. Operating System – II

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

SECTION – I

1. Overview of the UNIX System.   2
   System structure , user perspective , Operating System services, assumption about H/W.

2. Introduction to kernel   3

Architecture of UNIX operating system, introduction to system concepts, kernel data structure, system administration.

3. The Buffer Cache :   5
Buffer headers, structure of the buffer pool, scenarios for retrieval of a buffer, reading and writing disk blocks, advantages and disadvantages of cache.

4. Internal Representation of Files :   6
Inodes, structure of the regular file, directories, conversion of a pathname to inode, super block, inode assignment to a new file, allocation of disk blocks, other file types.

5. The Structure of process :   6
Process stages and transitions, layout of system memory, the context of a process, Saving context of a process, manipulation of the process address space.

SECTION - II

6. Process Control & Scheduling :   6
Process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, the shell, system Boot and the Init process. Process Scheduling, system call for time, clock.

7. Introduction to the Architectureof Symbian OS :   6
History of Symbian OS, Design Goals and Architecture , Basic Design Patterns of Symbian OS , Why Architecture Matters , Symbian OS Layer by Layer , The Key Design Patterns , The Application Perspective , Symbian OS Idioms , Platform Security from Symbian OS v9 .

8. The Symbian OS Layered Model   2
Introduction , Basic Concepts , Layer-by-Layer Summary of the Symbian OS v9.3 Model , What the Model Does Not Show , History.

9 The UI Framework Layer and The Application Services Layer   6
Introduction ,Purpose , Design Goals , Overview , Architecture A Short History of the UI Architecture ,Component Collections, Legacy Application Engines

10 The OS Services Layer   4
 Introduction , Purpose , Design Goals ,Overview , Architecture , Generic OS Services Block , Multimedia and Graphics Services Block , Connectivity Services Block

Text Book :

1. The design of Unix Operating System - Maurice J. Bach (PHI)
2. The Symbian OS Architecture Sourcebook – Ben Morris(Willey).

TE (Information Technology) Semester - VI

3. Software Testing And Quality Assurance

Lectures : 3 Hrs/Week   **Theory : 100 Marks**

SECTION – I

1. **Software Measurement :**

   Measurement in software engineering, Classifying software measures, applying the Framework, software measurement validation.   **(6)**

2. **Software metrics data collection:**

   Definition, storing, extraction and collection of data, analyzing software measurement data analyzing results of experiments, simple analysis techniques, more advanced methods, Overview of statistical test.   **(6)**

3. **Software Engineering Measurement:**

   Size: software size, length, reuse, functionality, complexity. Structure: Types of structure measure, control flow structure, Modularity and information flow attributes, Object oriented metrics, Data structures.   **(6)**

SECTION – II

4. **External product attributes:**

   Modeling software quality, Measuring aspect of quality.   **(4)**

5. **Software reliability:**

   Basics of reliability theory, Software reliability problem, Parametric Reliability growth models, Predictive accuracy, Importance of operational environment, Wider aspects of software reliability.   **(6)**

6. **Making process predictions:**

   Goal estimates, Cost estimation: problems and approaches, Models of effort and cost, Problem with existing modeling methods, Dealing with problems of current estimation methods, Implications for process predictions.   **(6)**

7. **Case study of testing tools:**

Text Books:

1. Software Metrics – A rigorous & practical approach -Norman Fenton, Shari Lawrence Pfleeger (THOMSON – BROOKS)
2. Software Testing – Renu Rajani, Pradeep Oak
3. URL-http://www.automatedqa.com/products/testcomplete/

TE (Information Technology) Semester - VI

4. Internet Technology

Lecture	**:** 4 hrs/week	**Theory**	**:** 100
Practical	**:** 2 hrs/week	**T/W**	**:** 25 Marks
		POE	**:** 50 Marks

SECTION-I

1. Client server model & socket interface:

The Socket Interface, The Client Server model and Software design, Concurrent processing in client-server software, Algorithms and issues in Client-Server design, Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet Super server (inetd). **(7)**

2. Next Generation IPv6 and ICMPv6:

IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6. **(4)**

3. BOOTP, DHCP and Domain name system:

Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, encapsulation. BOOTP, DHCP **(6)**

4. Remote Login: TELNET and File Transfer FTP, TFTP:

Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling the server, Out-of-band signaling, Escape charter, Mode of operation, user interface.

FTP: Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, TFTP. **(6)**

SECTION-II

5. Electronic mail: SMTP, POP, IMAP

Architecture, User agents, addresses, delayed delivery, Aliases, Mail transfer agent: SMTP commands & responses, mail transfer phases, MIME, Mail Delivery, mail access protocols, SNMP. **(7)**

6. World Wide Web – HTTP

Architecture, Web Documents, HTTP Transaction, Request & Response messages: header & examples, Persistent vs. non persistent HTTP, Proxy Servers **(6)**

7. Multimedia in Internet

Streaming stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/Video, Real-Time Transport Protocol (RTP), Real-time Transport Control Protocol (RTCP), and Voice over IP (VoIP): Session Initiation Protocol (SIP) and H.323 **(6)**

8. Protocol analyzing and Simulation tools

Tcpdump, Wire-shark, ethereal, Study of Network Simulator 2 (NS-2) - installation, configuration, NS simulator preliminaries, working with trace files, Example scripts. **(4)**

Text Books:

4. TCP/IP protocol suite – Behrouz A. Forouzen (Tata Mag. Hill)
5. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Applications (2nd Ed.) – D. E. Comer, David L. Stevens (Pearson Ed.)
6. Unix Network Programming – W. Richard Stevens (PHI)

Reference Books:

1. TCP/IP Illustrated, The Protocols, Vol. I – W. Richard Stevens, G. Gabrani (Pearson Ed.)
2. Internetworking with TCP/IP, Vol. I, Principles, Protocols, and Architectures (4th

Ed.) – D. E. Comer (Pearson Ed.)

3. NS Simulator for beginners - Lecture Notes by Eiten Altman and Tania Jimenez (http://www-sop.inria.fr/maestro/personnel/Eitan.Altman/COURS-NS/n3.pdf)

4. NS Manual (http://www.isi.edu/nsnam/ns/doc/)

Term work: It should consist of 10 to 12 assignments to be implemented on Linux/Unix. Following is the minimum list of Practical Problems. The Teacher/student is supposed to choose 1 or 2 other new assignments based on the syllabus to fulfill the requirement.

1. Client program using UDP to connect to well known services (echo, time of the day service etc.).

2. Implementing concurrent TCP multiservice client/server.

3. Implementing Iterative UDP client/server.

4. Write a program to implement echo server using IPv6 socket.

5. Study of following DNS Tools with all its options.
   nslookup, dig, host, whois

6. Implement trivial file transfer protocol (TFTP).

7. Write program to send a mail using SMTP commands and receive a mail using POP3 commands.

8. Developing Personal Website with database connectivity.

9. Capturing & Analyzing operation of various application layer protocols using network protocol analyzer. (Wireshark and tcpdump)

10. Installation, configuration of NS-2 and Simulation of simple protocols using NS-2 scripts (Ref.: http://www.isi.edu/nsnam/)

11. Study of various streaming multimedia protocols in Internet (Using various audio/video streaming services on the Internet)

TE (Information Technology) Semester - VI

5. Information System Security

Lectures : 3 Hrs/Week   **Theory :** 100 Marks

SECTION – I

1. Symmetric Ciphers :

Overview – Services, Mechanism and Attacks, The OSI Security. Architecture, A model for network security Overview of Classical Encryption techniques Block Cipher and Data Encryption Standard – Simplified DES, Block. Chiper principles, The Data Encryption Standard, The strength of DES, Block Cipher design principles.   **(7)**

2. Asymmetric Ciphers :

Public Key Cryptography and RSA – Principles of Public Key Cryptosystems, The RSA Algorithm Key management ; Other public key cryptosystems – Key Management, Diffie- Hellman Key Exchange, Message Authentication and HASH Functions – Authentication requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Digital Signatures and Authentication Protocols – Digital Signatures, Authentication Protocols, Digital Signature Standard.   **(10)**

SECTION – II

3. Network Security practice:

Authentication Applications – Kerberos, X.500 Authentication Service Electronic Mail Security – Pretty Good Privacy, S/MIME IP Security – IP Security Overview, IP Security Architecture, WEB Security – Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.   **(8)**

4. System Security:

Intruders – Intruders, Intruder detection, Password Management, Malicious Software – Viruses and Related Threats, Virus Countermeasures, Firewall design principles, Trusted system.   **(6)**

5. Issues in digital security :

Legal, Privacy and Ethical issues in digital security Program and data Protection by patents, copyrights and trademarks, information and the law, computer crime, privacy, ethical issues in digital security and codes of professional ethics.   **(4)**

Text Book:

1. Williams Stallings – Cryptography and Network security principles and practices. Pearson Education (LPE)

Reference Books:

1. Menezes, A.J., P.C.Van Oorschot, and S.A. Vanstone, "Handbook of Applied Cryptography"
2. Schneir, Bruce, "Applied Cryptography : Protocols and Algorithms"
3. Cryptography and network security – Atul Kahate (TMGH)
4. Network Security private communication in a practice – char tic Kaufman, Radio Perl man, Mike spicier (2nd Edition Pearson Print ice Hall)

TE (Information Technology) Semester - VI

6. Application Development Tool –II

Lecture   **:** 2 hrs/week   **Term work**   **:** 25 Marks
Practical   **:** 4 hrs/week   **OE**   **:** 25 Marks

1. **Introduction to .net:** What is .net, Why .net, Advantages.

2. **Dotnet framework:** Three tier architecture, CLR, MSIL, JIT, CLS, CTS, Namespaces, Languages.

3. **Language fundamentals:** Data types - Value types , Reference types, Variable declaration and initialization, Operations, Conditional statements, Looping , statements, Arrays , Structures , Enumerators.

4. **OOPs concepts:** Class and object, Types of classes, Creating and using namespaces, Passing arguments to methods – pass by in, out, param, address, Encapsulation, Abstraction, Inheritance, Overloading .

5. **Delegates and Events:** Learning about delegates, Delegates as base events, User defined events.

6. **File handling:** System.IO namespace, Path, File, and directory classes, Reading and writing with files, StreamReader and StreamWriter class.

7. **GUI Programming:** Introduction to GUI Application and their components, Elements of GUI – controls, methods, properties, events, Form, Controls, Creating and using MDI application.

8. **Database programming with ADO.NET:** Overview of ADO.NET , Namespaces, Classes, Data retrieval methods – connected , disconnected, Datatable, Dataset, Dataview , Using the Data Controls.

Reference Books:

1. Microsoft Visual C# 2005 Step by Step - Author - John sharp
2. Beginning Visual C# 2005 Express Edition: From Novice to Professional

- Peter Wright.

3. Programmer's Introduction to C# 2.0- Gunnerson and Wienholt

Termwork: It should consist of minimum 14 practical assignments based on the syllabus covering the following.

1. Language introduction – any program including variable declaration, looping etc.
2. Based on oops – class, inheritance, partial class, passing arguments etc.
3. Using events and delegates
4. Based on windows programming
5. File handling – xml can be introduced
6. Database programming – connected
7. Database programming – disconnected, use of dataset, dataadapter, dataview

TE (Information Technology) Semester - VI

7. Soft Skills

| **Tutorials : 2 hrs/week** | **Term work** | **: 25 Marks** |
| **Practical:** 2 hrs/week | **OE** | **: 25 Marks** |

The objective of this course is to enable students to acquire and enhance communication and professional skills required for personality development, corporate business and entrepreneurship skills. The syllabi contents are as per the modules proposed by **Infosys Technologies Ltd., Pune region.**

During the tutorial and practical sessions, it is expected that the contents of all modules should be delivered to the students of different batches and assignments be given based on the activities discussed as per the modules. Evaluation of the term work should be done on continuous basis and two tests (mid term and end term tests) should be conducted. Students must demonstrate the acquired skills by means of giving presentations, group discussions, interviews, etc. The modules proposed are as under.

1. Art of communication
   Communication Theory
   Barriers and Filters
   Active Listening
   Non Verbal Communication
   Feedback and Response
   Body Language

2. Hidden data of communication
    Dealing with feelings
    Assertiveness
    Self – confidence
    Emotional Intelligence
3. World of teams
    Team concept
    Elements of team work
    Formation of a team
    Team based activities
4. Adapting to corporate life
    Corporate Grooming and dressing
    Business Etiquette
    Business Ethics
    Dinning Etiquette
    Ethics policy
5. Discussions, decisions and presentations
    What are group discussions
    Types of Group Discussions
    Presentations
    Decision making
    Interview Skills
    Resume Writing.
6. Any other module as and when proposed by Infosys.

Shivaji University, Kolhapur

Equivalences of T.E. (IT) for repeater students

TE (IT) Sem.-V

Sr.no.	TE (IT) –I (Pre-Revised)	Equivalent / Replacement subject (Revised)
1	Computer organization & Architecture	Computer organization & Architecture of SE (IT) Sem-IV
2	Operating Systems - I	Operating Systems - I of TE (IT) Sem - V
3	Computer Networks - II	Computer Networks of TE (IT) Sem - V
4	Software Engineering	Software Engineering of SE (IT) Sem -IV
5	Digital Communication	Digital Communication Concepts.
6	Application Development Tool-I	Application Development Tool-I of TE (IT) Sem - V

T.E. (IT) Sem.-VI

Sr.no.	TE (IT) II (Pre-Revised)	Equivalent / Replacement subject (Revised)
1	Image Processing	Image Processing Concepts.
2	Operating System – II	Operating Systems – II of TE (IT) Sem - VI
3	Database Engineering	Database Engineering of TE (IT) Sem - VI
4	Organizational Management and Behavior.	Organizational Management and Behavior of TE (IT) Sem -V
5	Internet Technology	Internet Technology of TE (IT) Sem – VI
6.	Application Development Tool-II	Application Development Tool-II of TE (IT) Sem - VI

Note : The syllabus for the replaced subjects is as given below.

Digital Communication Concepts

SECTION-I

1. Introduction to communication systems: 3
   Modulation schemes, Bandwidth requirements and noise.

2. Information Theory: 4
   Introduction to information theory, Average and mutual information, Entropy, Joint and conditional entropy. Rate of information, Redundancy, channel capacity, Entropy coding.

3. Probability and Stochastic process: 6
   Random variables, Probability distribution and densities, Random process, Stationary,

Statistical averages.

4. Source Coding: 6
   Uniform, non uniform quantization .PCM, APCM, DPCM, ADPCM, DM, Performance of
   the above coding schemes (e.g. S/N etc.)

SECTION-II

5. Channel Encoding: 4
   Block codes ,Cyclic codes, Convolution codes, Criteria for code selection, Practical
   consideration in the application of the code.

6. Carrier Modulation and Detection: 6
   ASK, FSK, PSK, BPSK, DPSK, DEPSK, detection schemes.

7. Optimum Detection: 7
   Matched filters, Decision theory, Bay's criterion, Minimum Error criterion, Receiver
   operating characteristics.

8. Broadband communication system: 3
   Multiplexing, TDM& FDM, Short and long haul systems, Coaxial cable, Fiber optic links,
   Microwave links.

References Books:
1. Principles of Digital Communications.- Das, Mullick, Chatterjee.
2. Digital Communication – Proakis.
3. Digital Communication System Design – Roden.
4. Principles of Digital and Analog Communications – J.D. Gibson.

Image Processing Concepts

SECTION – I

1. Image , digitized image & it's properties :   6
   Elements of visual perception & its attributes, Digitised Image - image function,
   mathematical representation.Image digitization - Sampling & Quantization,Properties -
   distance , pixel adjacency, region, background, holes, brightness, segmentation, border,
   edge, convex hull , histograms, color, Noise.

2. Image pre – processing: 6
    Brightness transformation, geometric transformation, Local Processing, Image
    smoothening and edge detection.

3. Image enhancement in special domain : 6
   Threshold, Edge-based segmentation, Edge relaxation, Border tracing, Hough
    transform. Region-based segmentation, Region merging, Region splitting.
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SECTION – II

4. Image Enhancement in frequency domain : 6
   Fourier Transform,1-D & 2-D, DFT, Handmard Transform , Discrete Cosine
   Transforms, Introduction to Wavelet Transform, Application of Image transform.

5. Space reorientation and Detection: 6
   Region Identification, Contour-based representation. Chain codes, B-Spline
   Reorientation.

6. Image Compression : 6
   Redundancy & fidelity criteria , Error free compression, Methods of compression,
   standards, Binary , continuous tone still, Video.

Text Books :

1. Computer vision & Image processing - by Milan Sonaka.
2. Digital Image Processing - by Gonzalez (Addision Wesley)

Reference Books:

1. Elements of Digital Image Processing & Computer Vision – by Andrew Low(MGH)
2. Digital Image Processing - Pratt.
3. Fundamentals of digital Image Processing – by A. K. Jain.