

UNIVERSITY OF MUMBAI

**Proposed syllabus
For
T. Y. B. Sc. Computer Science**

**(To be Implemented from
June, 2010)**

TYBSc Computer Science Syllabus

- There are 4 units in each paper. The detailed references of books are either mentioned at the respective topics or at the end of the paper.
- It is expected that the question paper will have 5 questions as given below –

Questions	Term I	Maximum Marks* (For Paper I, II,III &IV)	Maximum Marks* (For AC1 & AC2)
Q1	Based on Units 1, 2, 3 & 4	20	12
Q2	Based on Unit 1	20	12
Q3	Based on Unit 2	20	12
Q4	Based on Unit 3	20	12
Q5	Based on Unit 4	20	12
	Total	100	60

* In papers I to IV, maximum marks with options should be set for 30 marks with internal options and for AC1 & AC2, maximum marks with options should be set for 18 marks with internal options.

- Syllabus details gives list of practicals with minimum number of practicals to be performed.
- For the purpose of examination, the break-up of total marks of practical will be as follows –

A) Main Subject Practical Examinations –

Experiment I (Group I Practical)	:	45 marks
Experiment II (Group II Practical)	:	45 marks
Experiment III (Group III Practical)	:	45 marks
Experiment IV (Group IV Practical)	:	
Project	:	50 marks

Journal(Group I To III) &

Viva voce on Journal	:	15 marks
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200 marks

B) Applied Component Practical Examination

Experiment I (Group I AC)	:	35 marks
Experiment II (Group II AC)	:	35 marks

Journal(Group I & II) &

Viva voce on Journal	:	10 marks
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80 marks

Note : Each student must maintain a record of experiments and project performed as per syllabus and must bring a certified journal and project report duly signed by the teacher concerned and HOD at the time of final examination.

- **The Bachelor of Science BSc with Computer Science course has the status as one of the subject at the BSc course. It is further clarified that adequate laboratory staff are required for conduct BSc Computer Science practicals, on the same pattern as with the other science subjects such as physics, chemistry etc. For smooth conduct of practicals at FY, SY and TYBSc computer science, a minimum of 1 lab assistant and a minimum of 1 lab attendant be provided for each lab, each session, during entire period of laboratory practical session.**

Main	Subject Title	No. Of lectures	Theory Marks	Practical Marks	Total Marks
Paper I	Data Communication, Networking & Security	120 (4 lectures per week)	100 (3 Hr Exam)	Group I 50 Linux and Database (4 lab lectures per batch per week)	150
Paper II	Advanced Java	120 (4 lectures per week)	100 (3 Hr Exam)	Group II 50 Advanced Java (4 lab lectures per batch per week)	150
Paper III	Operating Systems & Linux	120 (4 lectures per week)	100 (3 Hr Exam)	Group III 50 Elements of Software Engineering and Project Management (4 lab lectures per batch per week)	150
Paper IV	DBMS II and Software Engineering	120 (4 lectures per week)	100 (3 Hr Exam)	Group IV 50 Project (4 lab lectures per batch per week)	150

Applied Component	Subject Title	No. Of lectures	Theory Marks	Practical Marks	Total Marks
AC I	Principles of Web Design and Web Technologies	60 (2 lectures per week)	60 (3 Hr Exam)	Group I- AC 40 Web Technologies (2 lab lectures per batch per week)	100
AC II	Dot Net Technologies	60 (2 lectures per week)	60 (3 Hr Exam)	Group II- AC 40 Dot Net Technologies (2 lab lectures per batch per week)	100

Note: For students offering 3 units of computer science at TYBSc , paper I and II (of 6 units) and group III and group IV practicals(of 6 units) course will form the course contents.

Paper I

Data Communication, Networking & Security

- Note :**
- 1. Students can be made familiar with practical aspects by conducting demo sessions**
 - 2. Demo session can be either Physical/Audio-Video/Online Demo**

Unit I (30 lectures)

Introduction - Data Communication, Networks, Internet, Intranet, Protocols, OSI & TCP/IP Models, Addressing

Physical Layer – Signals, Analog, Digital, Analog VS Digital, Transmission Impairment, Data Rate Limits, Performance

Digital Transmission – Line Coding (Unipolar, Polar, Biphasic), Block Coding(4B/5B Encoding), Analog to digital conversion, PCM, Transmission Modes,

Analog Transmission – Digital to analog conversion(ASK,FSK,PSK, QAM), Analog to Analog conversion

Multiplexing – FDM, WDM, Synchronous TDM(time slots & frames, interleaving, data rate management),

Spread Spectrum – FHSS, DSSS

Transmission Media – Guided & Unguided

Switching – Switching, Circuit-Switched Networks, Datagram networks, Concept of Virtual circuit networks, structure of circuit switch & packet switch, Concepts of DSL & ADSL

References -

1. Data Communication & Networking (Forouzan)– IV Edition → Chapters (1, 2, 3, 4, 5, 6, 7, 8, 9)

Demo :

1. Demo of installing NIC cards, Min. LAN Settings such as IP Address
2. Demo of various types of cables[if available], Cross cable and its use, Crimping
3. Study of lab network [type of network, topology, bandwidth, switches]

Unit II (30 lectures)

Data Link Layer –Error correction & detection, Types of errors, Detection VS Correction, Block Coding, Hamming Distance, Linear Block codes(single parity check, hamming codes), Cyclic codes, CRC Encoder & Decoder, CRC Polynomial & its degree, Checksum

Data Link Control & Protocols – Framing, Flow & Error Control, Simplest, Stop-N-Wait, Stop-N-Wait ARQ, Go Back N ARQ, Selective Repeat ARQ, Piggybacking

HDLC & PPP– HDLC Modes, HDLC Frames, PPP, PPP Transition states

Multiple Access – Random(CSMA), Controlled(Reservation, Polling, Token Passing), Channelization(FDMA, TDMA, CDMA)

Wired LAN – LLC, MAC, Ethernet, Ethernet frame, Addressing, Concept of *MBaseN* Ethernet, Bridged, Switched, Full Duplex Ethernet, Concept of Fast & Gigabit Ethernet

Wireless LAN - Introduction to WLAN(Architecture, Hidden, Exposed Station Problem), Introduction to Bluetooth & Architecture, Cellular telephony, Concept of 1G, 2G, 3G cellular telephony

Connecting Devices – Repeaters, Hubs, Bridges, Spanning tree algorithm, Two & Three layer Switches, Routers, Gateways, Backbone networks, Concept of VLAN

Network Layer –Logical addressing, IPv4 Addresses, Classful & Classless addresses, NAT, IPv6 Addressing,

References -

1. Data Communication & Networking (Forouzan)– IV Edition – Chapter(10, 11, 12, 13, 14, 15, 16, 19)

Demo :

1. Study of network connectivity devices[switches, modems/routers etc installed in lab]

Unit III (30 lectures)

Network layer protocol – Internetworking, IPv4, IPv4 protocol packet format, IPv6 Protocol & Packet format, IPv4 VS IPv6, Transition from IPv4 to IPv6, Address Resolution protocols(ARP, RARP), BOOTP, DHCP,

Routing Protocols - Delivery, forwarding, routing, types of routing, routing tables, Unicast Routing, Unicast Routing protocols, RIP, Concepts of OSPF, BGP & Multicast Routing

Transport Layer - Process to process delivery, UDP, TCP

Congestion Control & Quality of Service- Data traffic, Congestion, Congestion Control(Open Loop, Closed Loop & Congestion control in TCP), QoS and Flow Characteristics

Application Layer - DNS, Remote Logging(Telnet), SMTP, FTP, WWW, HTTP

References -

1. Data Communication & Networking (Forouzan)– IV Edition (Chapters 20, 21, 22, 23, 24, 25, 26, 27)

Demo :

1. Study of LAN Settings such as IP Addr, Subnet mask, Gateway Address, DNS addresses, Proxy etc
2. Accessing machines in networks, sharing files/folders and printers
3. Study of commands such as ping, netconfig, ipconfig, arp, netstat, route, traceroute etc [commands will depend on OS]
4. Useful Browser Settings

Unit IV[30 lectures]

Introduction: Introduction to system and network security, security attacks, security services and mechanisms.

Cryptography: Traditional and Modern Symmetric-Key Ciphers, DES and AES, Asymmetric –Key Cryptography, RSA and ELGAMAL cryptosystems. Message Digest, Digital Signature, Key Management

Network Security: Security at Application Layer (E-MAIL, PGP and S/MIME), Security at Transport Layer (SSL and TLS), Security at Network Layer (IPSec).

Firewall and Intrusion Detection: Firewalls and their types, DMZ, Limitations of firewalls, Intruders, Intrusion detection (Host based, Networked, Distributed), IDS.

Malicious software and Internet Security: viruses and related threats, virus countermeasures, denial of service attacks, *Hacking*, Security policies and plan, Strategies for a secure network.

References:

1. BF: “Cryptography & Network Security”, Behrouz A. Forouzan, Tata McGraw-Hill.
(1.1-1.4, 3.1-3.4, 5.1-5.2, 6.1-6.5, 7.1-7.6, 8.1, 8.2, 10.1-10.4, 11.1, 11.3, 13.1-13.5, 15.1-15.4, 16.1-16.3, 17.1-17.4, 18.1-18.4)

2. WS: “Network security essentials-applications and standards”, William Stallings, Edition, Pearson Education.(1.1-1.6, 2.1-2.6, 3.1-3.5, 5.1-5.2, 6.1-6.4, 7.1-7.3, 8.1-8.2, 9.1-9.3,10.1-10.3, 11.1-11.3)
3. AC: “Cryptography and Network Security”, Atul Kahate, Tata McGrawHill.

Demo

1. Antivirus software and its settings
2. Setting firewalls, Enabling/Disabling ports
3. Introduction to cyber crime and cyber law

Additional References

1. Computer Networks and Internets (5th Edition) - Douglas Comer
2. Computer Networks (4th Edition) - Andrew Tanenbaum
3. Networking Complete by Sybex Inc. and Sybex Inc.

Paper II

Advanced Java

UNIT I: (30 Lectures)

Introduction to JFC and Swing, Features of the Java Foundation Classes, Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees, Printing with 2D API and Java Print Service API.

JDBC Introduction, JDBC Architecture, Types of JDBC Drivers, The Connectivity Model, The java.sql package, Navigating the ResultSet object's contents, Manipulating records of a ResultSet object through User Interface, The JDBC Exception classes, Database Connectivity, Data Manipulation (using Prepared Statements, Joins, Transactions, Stored Procedures), Data navigation.

References

Ch 5, 7 of Ref 6

Ch10 of Ref 5, Ch 9 of Ref 6, Ch 4 of Ref 2

UNIT II: (30 Lectures)

Threads and Multithreading, The Lifecycle of a thread, Creating and running threads, Creating the Service Threads, Schedules Tasks using JVM, Thread-safe variables, Synchronizing threads, Communication between threads.

Overview of Networking, Working with URL, Connecting to a Server, Implementing Servers, Serving multiple Clients, Sending E-Mail, Socket Programming, Internet Addresses, URL Connections, Accessing Network interface parameters, Posting Form Data, Cookies, Overview of Understanding the Sockets Direct Protocol.

Introduction to distributed object system, Distributed Object Technologies, RMI for distributed computing, RMI Architecture, RMI Registry Service, Parameter Passing in Remote Methods, Creating RMI application, Steps involved in running the RMI application, Using RMI with Applets.

References

Ch 3 of Ref 2, Ch 11 of Ref 6, Ch15 of Ref 5, Ref 7

Ch 13 of Ref 5, Ch 5 of Ref 2, Ch 11 of Ref 6

Ch 16 of Ref 5, Ch 25 of Ref 4, Ch 8 of Ref 6, Ch 8 of Ref 2, Ref 7

Unit III: (30 lectures)

What Is a Servlet? The Example Servlets, Servlet Life Cycle, Sharing Information, Initializing a Servlet, Writing Service Methods, Filtering Requests and Responses, Invoking Other Web Resources, Accessing the Web Context, Maintaining Client State, Finalizing a Servlet.

What Is a JSP Page?, The Example JSP Pages, The Life Cycle of a JSP Page, Creating Static Content, Creating Dynamic Content, Unified Expression Language, JavaBeans Components, JavaBeans Concepts, Using NetBeans GUI Builder Writing a Simple Bean, Properties: Simple Properties, Using Custom tags, Reusing content in JSP Pages, Transferring Control to Another Web Component, Including an Applet.

References

Ch 3 of Ref 3, Ch 2,3,4 of Ref 1, Ref 7

Ch 4 of Ref 3, Ch 7,8,9 of Ref 1, Ref 7

Unit IV: (30 lectures)

Introduction to EJB, Benefits of EJB, Types of EJB, Session Bean: State Management Modes; Message-Driven Bean, Differences between Session Beans and Message-Driven Beans, Defining Client Access with Interfaces: Remote Access, Local Access, Local Interfaces and Container-Managed Relationships, Deciding on Remote or Local Access, Web Service Clients, Method Parameters and Access, The Contents of an Enterprise Bean, Naming Conventions for Enterprise Beans, The Life Cycles of Enterprise Beans, The Life Cycle of a Stateful Session Bean, The Life Cycle of a Stateless Session Bean, The Life Cycle of a Message-Driven Bean

Building Web Services with JAX-WS: Setting the Port, Creating a Simple Web Service and Client with JAX-WS.

References

Ch 20, Ref 3, Ch 14 of Ref 6, Ref 7

References:

1. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, O'reilly (SPD), Second Edition, 2008
2. Cay S. Horstmann, Gary Cornell, Core Java™ 2: Volume II–Advanced Features Prentice Hall PTR, 2001 (ISBN: 0-13-092738-4)
3. Eric Jendrock, Jennifer Ball, D Carson and others, The Java EE 5 Tutorial, Pearson Education, Third Edition, 2003
4. Herbert Schildt, Java2: The Complete Reference, Tata McGraw-Hill, Fifth edition, 2002 (ISBN 0-07-049543-2)
5. Ivan Bayross, Web Enabled Commercial Applications Development Using Java 2, BPB Publications, Revised Edition, 2006
6. Joe Wigglesworth and Paula McMillan, Java Programming: Advanced Topics, Thomson Course Technology (SPD), Third Edition, 2004
7. The Java Tutorials of Sun Microsystems Inc.

Paper III

Operating Systems and Linux

Unit I: (30 Lectures)

Introduction: Overview of Operating System, Evolution of Operating System, Different Services of Operating System

Operating System for Main frame Computer Systems: Batch Processing Systems, Micro programmed Systems, Time-Sharing System. Understanding Multiprogramming, Multiprocessing and Multitasking.

Operating System for Multiprocessor Systems and Distributed Systems, Operating System for Client Server & Peer-to-Peer Systems, Clustered Systems. Real time Operating System

Components of Operating System: Process Management, Main memory Management, Secondary storage Management, File Management, I/O Management. Operating System Services, Command Interpreter, Interface between user and Operating System. Introduction to System calls: Types of system calls

System programs and Operating System Structure: Layered approach, Kernel based approach, Operating system design and Implementation.

Process Management: Introduction to Process. Process states: two state and five state model, processes & resources, concurrent processes, process description, process control block and its role. Operation on processes, Cooperating processes

Interprocess Communication and light weight process: Direct & indirect communication, message passing, synchronization, buffering. Threads, single & multithreaded processes, user and kernel threads, multithreaded models, Threading issues, Creation of threads

CPU Scheduling and Process synchronization: Need for Process scheduling, queuing diagram, scheduler and its types, Scheduling queues. Need for Process switching, context switching, process synchronization, CPU scheduling algorithms.

General structure of a typical process, Critical Section Problem and its solutions, Two and multiple process solutions, Need for Mutual Exclusion, Classifying process interactions and Achieving mutual exclusion: Dekker's Algorithm, Peterson's Algorithm and their final correct solution for two processes.

Tools for process synchronization: Semaphores, Binary semaphores, monitors, message passing: their use & implementation for mutual exclusion.

[SG: Chapters 1, 3, 4, 5, 6 and WS: Chapter 3,4, 5]

Unit II: (30 lectures)

Classical Problems of Process synchronization:

Producer-Consumer problem for infinite and bounded buffers and its bounded buffer solution using Semaphore monitor and messages Reader-writer problem and its solutions with readers' priority and writers' priority, Dining-Philosophers Problem and its solutions

Concurrency and Deadlock: Deadlocks and their Characteristics, Resource Allocation Graph, methods of handling deadlocks. Deadlock prevention techniques, Deadlock detection and avoidance: safe and unsafe state, resource allocation algorithm, Banker's algorithm, Recovery from deadlock.

Memory management: Memory Management and its need, swapping technique, Contiguous memory allocation. Paging and Segmentation, Segmentation with paging, Introduction to Virtual memory, Demand

paging technique, Need for page replacement, Basic scheme, replacement algorithms, Thrashing and its cause.

File System: File Concept: attributes, operations, types, structure. File access methods, Different directory structure, File system structures, File system implementations. Directory implementations, Allocation methods, Free space management.

I/O System: Principles of I/O hardware and Software: typical bus structure, polling, interrupts, direct memory access, application I/O Interface

Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN. Examples related to disk arm movement.

Operating System Security: Introduction to security problem, Program and system threats, Intrusion Detection, Computer –Security Classifications.

[SG: Chapters 6, 7, 8, 9, 10, 11, 12, 13 14, 15 and 19]

WS: Chapters 4, 5]

Reference:

1. SG: “*Operating System Concepts*”- Abraham Silberschatz, Peter Galvin, Greg Gagne, John wiley & Sons.
2. WS: “*Operating Systems*”- William stallings, Pearson-Prentice Hall, Fifth Edition.

Additional Reference:

1. TW: “*Operating Systems*”- Andrew Tanenbaum & Albert WoodHull, Second Edition, PHI.
2. AG: “*Operating Systems*” – Achyut S Godbole, Tata Mc-Graw Hill,

Unit-III : (30 Lectures)

Linux System: History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File system, I/O. (SGG: 20.1 to 20.8)

Linux Basics: Looking into the Linux Kernel, GNU Utilities, Desktop environments. (RB: Chapter-1) , The Linux console (RB: Chapter-2) The Unix/Linux architecture, Features of Unix/Linux. . (SD: 2.1, 2.2)

Basic bash shell commands: Starting the shell, Shell prompt, Filesystem Navigation, File and directory listing, File handling, Directory handling, Viewing file contents. (RB: Chapter-3)

More bash shell commands: Monitoring programs, Monitoring disk space, Working with data files: Sorting, Searching, Compressing, Archiving. (RB: Chapter-4)

The Linux environment variable: Environment variables, setting environment variables, Removing environment variables, Default shell environment variables, setting the PATH environment variables, Locating system environment variables, Variable arrays, Using command aliases. (RB: Chapter-5)

Understanding Linux file permission: Linux security, Using Linux groups, Decoding file permissions, Changing security settings, Sharing files. (RB: Chapter-6)

Basic script building: Using multiple commands, Creating a script file, Displaying messages, Using variables, Redirecting Input and Output, Pipes, Performing math, Exiting the script. . (RB: Chapter-8)

Using structured commands: Working with the if-then, if-then-else and nesting if statements, test command, Compound condition testing, advanced if then features, the case command. (RB: Chapter-9)

More structured commands: for command, C-style for command, while command, until command, nesting loops, Looping on file data, controlling the loop, processing the o/p of a loop. (RB: Chapter-10)

Handling user input: Command line parameters, Special parameter variables, shift command, working with options, Standardizing options, Getting user I/P.(RB: Chapter-11)

Unit-IV : (30 Lectures)

Presenting data: Understanding I/O, Redirecting O/p in scripts, Redirecting I/p in scripts, Creating your own redirection, Listing open file descriptors, Suppressing command o/p, Using temporary files, Logging Messages. (RB: Chapter-12)

Script control: Handling signals, Running scripts in background mode, Running scripts without a console, Job control, Job Scheduling Commands: nice, renice, at, batch, cron table, Running the script at boot. (RB: Chapter-13)

Essential System Administration: root: The system administrator's login, The administrator's privileges, Startup & Shutdown. (SD: 15.1, 15.2, 15.5)

TCP/IP networking: TCP/IP Basics, TCP/IP Model, Resolving IP addresses, Applications, telnet, ftp, Berkeley commands. (SD: Chapter-17)

Advanced System Administration: Partitions & file systems, /etc/fstab, fsck, System startup and init, Shutdown & sync operation. (SD: 25.2, 25.6.3, 25.7, 25.8, 25.9)

Editors: Sed and awk (RB: Chapter-16)

Linux Firewall: Introduction to firewall, Displaying status of firewall, Turning an iptables Firewall on/off, Testing firewall, Configuring the firewall for Remote SSH Administration.(CS: 3.0, 3.7-3.11)

OpenSSH: Introduction, Starting and Stopping OpenSSH, Creating strong Passphrases, Setting up host keys for simplest authentication, Generating and copying SSH Keys, Public key authentication to protect system password, Hardening OpenSSH, Changing Passphrase, Retrieving a key, Managing SSH Configuration file, X-Windows and SSH, Mounting remote file system with sshfs. (CS: 7.0 to 7.13, 7.17)

Main References:

1. **SGG:** Operating System Concepts, 6e, Silberschatz, Galvin and Gagne, Wiley.
2. **SD:** Unix Concepts and Applications, 4e, Sumitabha Das., TMH.
3. **RB:** Linux Command line and Shell Scripting: Bible, Richard Blum, Wiley-India.
4. **CS:** Linux Networking Cookbook, Carla, Schroder, O'reilly.

Additional References:

1. Unix Complete Reference, TMH.
2. Linux Complete Reference, TMH.
3. Linux Command Reference. Shroff.

Paper IV

DBMS-II & Software Engineering

UNIT I: [30 Lectures]

Decomposition: Functional dependency, Closure of a set of functional dependency, Lossless-Join decomposition, Multi valued dependency and fourth normal form, Join dependency, Fifth normal form.

Concurrency Control: Concept of a transaction, ACID properties, Serial and serializable schedules, Conflict and View serializability, Precedence graphs and test for conflict serializability.

Enforcing serializability by locks: Concept of locks, the locking scheduler, Two phase Locking, upgrading and down grading locks, Concept of dead locks, Concurrency control by time stamps, The Thomas Write rule.

Crash Recovery: ARIES algorithm. The log based recovery, recovery related structures like transaction and dirty page table, Write-ahead log protocol, check points, recovery from a system crash, Redo and Undo phases.

UNIT II: [30 Lectures]

Sequences: creating sequences, referencing, altering and dropping a sequence.

Fundamentals of PL/SQL: Defining variables and constants, PL/SQL expressions and comparisons: Logical Operators, Boolean Expressions, CASE Expressions Handling, Null Values in Comparisons and Conditional Statements, PL/SQL Datatypes: Number Types, Character Types, Boolean Type, Datetime and Interval Types.

Overview of PL/SQL Control Structures: Conditional Control: IF and CASE Statements, IF-THEN Statement, IF-THEN-ELSE Statement, IF-THEN-ELSIF Statement, CASE Statement, Iterative Control: LOOP and EXIT Statements, WHILE-LOOP, FOR-LOOP, Sequential Control: GOTO and NULL Statements, Concept of nested tables.

Query evaluation: System Catalog, Evaluation of relational operators like selection, projection, join and set, introduction to query optimization.

Cursors: Concept of a cursor, types of cursors: implicit cursors; explicit cursor, Cursor for loops, Cursor variables, parameterized cursors,

Transactions in SQL: Defining a transaction, Making Changes Permanent with COMMIT, Undoing Changes with ROLLBACK, Undoing Partial Changes with SAVEPOINT and ROLLBACK, Defining read only transactions, explicit locks: transaction and system level, Choosing a Locking Strategy: ROW SHARE and ROW EXCLUSIVE Mode.

References:

- (a) *Ramakrishnam, Gehrke*, "Database Management Systems", McGraw- Hill.
(Chapter 12.1-12.4, 16.1-16.4, 17.1- 17.4, 17.6.2, 18.1-18.6, 19.1-19.3, 19.5, 19.8)
- (b) *Ivan Bayross*, "SQL,PL/SQL -The Programming language of Oracle", B.P.B. Publications, 3rd Revised Edition[Chap 11, 15- 17]

(c) *Michael Abbey, Michael J. Corey, Ian Abramson*, Oracle 8i – A Beginner’s Guide, Tata McGraw-Hill. (**Chapter 8**)

Additional References:

- (a) *Elsmasri and Navathe*, “*Fundamentals of Database Systems*”, Pearson Education.
- (b) Peter Rob and Coronel, “*Database Systems, Design, Implementation and Management*”, Thomson Learning
- (c) C.J.Date, Longman, “*Introduction to database Systems*”, Pearson Education.
- (d) Jeffrey D. Ullman, Jennifer Widom, “*A First Course in Database Systems*”, Pearson Education.
- (e) Martin Gruber, “*Understanding SQL*”, B.P.B. Publications.
- (f) George Koch and Kevin Loney, ORACLE “*The Complete Reference*”, Tata McGraw Hill, New Delhi

Unit III (30 lectures)

Project management : Revision of Project Management Process[Ref3-2.4.1], Role of Project Manager, Project Management Knowledge Areas[Ref1-Chap3(Pg99-100,104)]

Managing Changes in requirements[Ref3-2.4.4]

Role of software Metrics [Ref3-1.3.2, Ref2-23.1.5]

Size & Effort Estimation –Concepts of LOC & Estimation[Ref2-26.6.2,26.6.3], Function Point[Ref3-3.6.1, Ref2-25.2.3], COCOMO Model [Ref3-5.2.4], Concept of Effort Estimation & Uncertainty[Ref3-5.2.5.2.1] [Ref1-Chap3(Pg121)]

Project Scheduling[Ref2-27.2,27.2.1 & Ref3-5.3.2], Building WBS, Use of Gantt & PERT/CPM chart [Ref1-Chap3(Pg112-118)][3 lectures] Staffing [Ref1-Chap3(Pg100), Ref3-5.3.4]

Configuration Management Process & Functionality & Mechanism[Ref3-2.4.3]

Process Management, CMM & its levels[Ref3-2.4.5],

Risk Management & activities [Ref3-5.6.1-5.6.3]

Management of OO software Projects - Object oriented metrics, Use-Case Estimation[Ref2-23.3.3, 25.2.5, 26.6.7-26.6.8,27.5.3]

Selecting development tools, Introduction to CASE[Ref1-Chap2(Pg85-86, Pg 341)]

Changing Trends In Software Development - Unified Process, Its phases & disciplines, Agile Development – Principles & Practices, Extreme programming- Core values & Practices [Ref1-Chap16(Pg692-705)]

Frameworks, Components, Services, [Ref1-Chap16(714-717,720-721)], Introduction to Design Patterns, [Ref4-(1.1,1.3,1.4, Pg 26 to 28)] Open Source [Ref2-31.3.7]

References :

1. System Analysis & Design – Satzinger, Jackson, Burd, Cengage Learning, India Ed.
2. Software Engineering- A Practitioner’s Approach, 7th Edition, McGraw Hill Int.
3. Integrated Approach to Software Engineering - Pankaj Jalote (Narosa), 3rd Edition
4. Design Patterns – Elements of Reusable Object-Oriented Software, Pearson
By – Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,

Unit IV (30 lectures)

Software Testing: Introduction to Quality Assurance, Six Sigma [Ref1-14.4.4, 16.2, 16.5.2]

Testing Fundamentals, Common Terms(like Error, Fault, Failure, Bug, Crash) Objectives of testing, Challenges in Testing, Principles of Testing [Ref2-1.2, 1.2.1, 1.2.3,1.2.4, 1.5],

Static Testing – Introduction & Principles [Ref2-3.1,3.2]

Types of Testing – Levels of testing such as Unit testing, Integration testing, System testing, Validation Testing, Acceptance testing,

Types of testing such as Black box, White Box, Functional, Performance, Regression, Acceptance, Volume, Stress, Alpha, Beta testing [Ref2-1.4]

Black Box Testing : Introduction, Equivalence partitioning, Boundary-value analysis, Robustness testing, Cause Effect Graph, [Ref2-4.1-4.5, Ref3-10.2.3]

White Box Testing :Statement Coverage, Branch/Decision Coverage, Condition Coverage, Graph Matrix, Cyclomatic complexity, Mutation Testing [Ref2-5.1-5.6]

Object Oriented Testing & Web site testing – Object Oriented Testing Strategies, Testing methods, [Ref1-19.3, 19.4.3, 19.4.5, Ref2-11.2]] Overview of web site testing[Ref1-20.1.1]

Planning Software Testing – Test Plan, Test Plan Specification, Test Case Execution and Analysis, Defect logging and tracking [Ref3-10.4.2-10.4.5]

References:

1. Software Engineering- A Practitioner's Approach, 7th Edition, McGraw Hill Int.
2. Software Testing – Concepts & Practices, Narosa,
3. Integrated Approach to Software Engineering - Pankaj Jalote (Narosa)

Additional References

1. Software Engineering: Waman Jawadekar, TMH
2. Software Engineering : Sommerville, VIIIth Edition, Pearson Education

Group I : Linux & Database

List of Practicals

- 1 Study of Basic and advanced Linux Commands
- 2 Study of filter commands
- 3 Basic Shell scripting
- 4 Advanced Shell scripting
- 5 Writing PL/SQL Blocks with basic programming constructs
- 6 Procedures and Functions in PL/SQL Block
- 7 Implementing cursors & sequences
- 8 Study of transactions and locks

Note: Demo of installation of Linux should be given to students

Group II : Advanced Java

List of Practicals

- 1 Developing GUI applications using Swing
- 2 Database programming with Java
- 3 Study of Multithreading
- 4 Study of Socket programming and Distributed computing
- 5 Server-Side Programming using Servlets
- 6 Server-side programming using JSP
- 7 Developing Enterprise Java Beans
- 8 Developing Web services in Java

Group III : Elements of Software Engineering and Project Management

List of Practicals

- 1 Preliminary Design of a software system in context with its components, descriptions, limitations, advantages and disadvantages for a given Case Study.
- 2 To draw Event Table & Use Case for a given Case Study.
- 3 To draw Activity Diagram, Class Diagram & Object Diagram for a given Case Study.
- 4 To draw Sequence diagram / Collaboration diagram for a given Case Study.
- 5 To derive tables from entities & relationships with integrity constraints for a given Case Study.
- 6 To draw Component, Package & Deployment diagram for a given Case Study.
- 7 To design Form Layouts/Web Pages/Report layouts for a given Case Study.
- 8 To list test cases and validations for a given Case Study.

Group IV : OOAD Project

General Guidelines for Project Development

1. Faculties should arrange project demos for SY students at the end of the year or just at the beginning of TY. The demos can be of some good students of previous TY batches or it can be a project developed by faculties themselves.
2. SY students should be encouraged to start finding projects in the summer vacation. It will be advantageous if students finish majority of the preliminary investigation phase during summer vacation. Faculties may take one or two introductory sessions for SY students before the vacation which will help students to work on preliminary investigation phase during summer vacation.
3. It can be Stand Alone, Multi-user or Web Based. Projects must be done using Java or .Net Technologies & RDBMS.
4. Each student shall do the project individually, though a project with the same topic name could be done by more than one student.
5. A project guide should be assigned to students (**Maximum 24 students for 1 guide**). He/she who will assign a schedule for each phase of the project and hand it over to students. The guides should oversee the project progress on a weekly/fortnightly basis. The guides should control iteration if any non-linear technique is used for project development. It is advisable that the design phase gets over in the first term. Sample schedule can be as follows –

Phase	Time of completion
Preliminary investigation	30 th June
System Analysis	14 th August
System Design	30 th September
Coding	15 th December
Implementation	5 th January
Project Report Submission	15 th January

6. College can arrange few sessions by experienced industry people on project management/best practices/technologies etc.
7. The student will maintain a Gantt chart from the given schedule and completion of each phase should be noted on the chart.
8. **Like Gantt chart, a separate table should be maintained to check timely completion of the project. The table should contain the names of phases & its sub-phases, Expected Date of completion and Actual Date of completion. The guide should sign and mention the actual date of completion in the specific column of this table. This table should be produced at the time of final project demonstration and should be used for assigning marks. The dates of this table should match with the dates of Gantt chart. For the students who fail to do projects as per the schedule, project guide can sign the projects with late remarks.**

Sample Phase completion table –

Phase Title	Expected Date of Completion	Actual Time of Completion with Guide's Signature	Remarks
I. Phase Name	30 th June		
a) Sub Phase 1...	20 th June		
b) Sub Phase N	30 th June		
II. Phase Name	14 th August		
a) Sub Phase 1...	5 th August		
b) Sub Phase N	14 th August		

9. After the completion of phase/projects, demos can be planned in front of faculties/clients/students.

10. Projects should have at least following:

- a) Good content management, presentation & meaningful images
- b) Data Entry with Validations
- c) Suitable navigation scheme (menus/toolbars/tabs/links etc)
- d) Record Manipulation (add, update, delete, display, search, sort)
- e) Transactions / Sessions /Reports / Feedback/Registration whichever applicable
- f) Login accounts (Admin & User) with separate functionalities for administrators and users

11. A certificate should be added in the project report which should contain the following information –

- a) The fact that the student has successfully completed the project as per the syllabus and that it forms a part of the requirements for completing the BSc degree in computer science of University of Mumbai.
- b) The name of the student and the project guide,
- c) The academic year in which the project is done,
- d) Date of submission,
- e) Signature of the project guide and the head of the department with date along with the department stamp,
- f) Space for signature of the university examiner and date on which the project is evaluated.

12. Project should be evaluated by External Examiner as follows –

- i. Project Quality → 10 marks
- ii. Adherence to schedule → 10 marks
- iii. Working of Project → 20 marks
- iv. Student's Presentation → 10 marks

Note →

- i. Evaluating “Adherence to schedule”** : A project can approximately have 5 phases. Completion of these phases on time will carry 2 marks. Sub-phases need not go as per the schedule but main phase should be completed as per the plan. However, a grace period of 7 days should be given for completing each phase. If the project gets delayed after 7 days of actual time of completion, then the marks can be cut. Concession of some more days can be given for students having genuine reasons (medical cases etc) but it should be mentioned in remarks.
- ii. Evaluating “Project Quality”**: It involves overall modules included in the project, whether it was sufficiently large enough so that it can be done in a year, whether validations were done for data entry, variety of reports etc.
- iii. Evaluating “Working of the Project”**: It involves error-free execution of the project.
- iv. Evaluating Student's Presentation**: Marks can be given based on the presentation skills of a student. A student can prepare a power point presentation for the project.

Index For Project Documentation

Acknowledgement
I. Preliminary Investigation
(i) Organizational Overview
(ii) Description of System
(iii) Limitations of present system
(iv) Proposed system and its adv. [For web project, URL can be mentioned]
(v) Feasibility Study
(vi) Stakeholders
(vi) Gantt Chart
II. System Analysis
(i) Fact Finding Techniques (Questionnaire, Sample Reports, Forms...)
(ii) Prototypes(if any)
(iii) Event Table
(iv) Use Case Diagram, Scenarios & Use Case Description
(v) ERD
(vi) Activity Diagram
(viii) Class diagram
(ix)Object Diagram
(x) Sequence diagram/Collaboration Diagram
(xii) State diagram
III. System Design
(i) Converting ERD to Tables
(ii) Design Class diagram[with UI classes, Persistent classes etc...]
(iii) Component Diagram
(iv) Package Diagram
(v)Deployment Diagram
(vi) Prg Flow charts & System flow chart
(vii) Structure Chart (Prg level and System level)
IV. System Coding
(i) Menu Tree / Sitemap
(ii) List of tables with attributes and constraints
(iii) Design Patterns used (if any)
(iv) Program Descr[Programs /Classes and their responsibilities in brief] with Naming Conventions
(v) Validations
(vi) Test Cases, Test Data and Test Results [Write test cases for all imp. programs]
(vii) Screen Layouts & Report Layouts
(viii) Program Listing[for dummy proj]
V. System Implementation / Uploading
VI. Future Enhancements
VII. References and Bibliography

Applied Component

Applied Component I Principles of Web Design & Web Technologies

Unit I [15 lectures]

Web Site Design Principles – Design for the Medium, Design for the Whole Site, Design for the User, Design for the Screen

Planning the Site – Create a Site Specification, Identify the Content Goal, Analyze your Audience, Build a Web Site Development Team, Filenames and URLs, Directory Structure, Diagram the Site

Planning Site Navigation – Creating Usable Navigation, Using Text-Based Navigation, Using Graphics-Based Navigation

Creating Page Templates – Understanding Table Basics, Table Pointers, Creating a Page Template

Unit References

Code: PWD (Ch 2,3,4,5)

Web Typography – Type Design Principles, Controlling Typography with the Element, Controlling Typography with Cascading Style Sheet, Styling with CSS

Graphics and Color – File Format Basics, Computer Color Basic, Choosing a Graphics Tool, Using the Element, Working with Hexadecimal Colors

HTML Frames – Understanding Frames, Frame Syntax, Targeting in Framesets, Planning Frame Content

Publishing and Maintaining Your Web Site – Publishing Your Web Site, Testing Your Web Site, Refining and Updating Your Content, Attracting Notice to Your Web Site

Unit References

Code: PWD (Ch 6,7,8,9)

HTML - HTML 4.0 Tag Reference, Global Attributes, Event Handlers, Document Structure Tags, Formatting Tags, List Tags, Hyperlinks, Image & Image map, Table Tags, Form Tags, Frame Tags, Executable Content Tags and Style Sheets,CSS

Unit References :

Code:ELJO (Ch3-9)

Unit II [15 lectures]

Introduction to Java Script (Functions, Objects)

Client-Side Java Script -Java script in web browser, windows and frames, the document object model, events and event handling, forms and form elements, dynamic html and saving state with cookies

References

Code: JSDG (Ch 7, 8, 11-18)

Code: Dummies (Ch 2)

XML- Introduction to XML, Problems with HTML & SGML, Types of XML Markup, Document Type Definitions, Using Style Sheets with XML, Creating XML well formed , valid Documents.

Reference:

Code: EIJO(Ch 12,13)

Code: Unleashed(Ch 1 to 3,5,6,8,9)

Unit III [15 lectures]

Introduction to Ajax -Working of Ajax from a user's perspective and a developer's perspective, Applications of Ajax : Searching in real time with live searches, Getting the answer with autocomplete Chatting with friends ,Dragging and dropping with Ajax, Getting instant login feedback, Ajax-enabled pop-up menus, Modifying Web pages on the fly, Google Maps and Ajax.

Ajax and PHP : Starting with PHP ,Getting a Handle on Variables ,Handling Your Data with Operators,Making Choices with the if Statement ,Round and Round with Loops,Handling HTML Controls,Getting data from text fields.Checking out data from check boxes,Tuning in data from radio buttons ,Sending Data to the Server

XML and Ajax

Creating and opening the XMLHttpRequest object., Handling asynchronous downloads,relative versus absolute URLs , Interactive Mouseovers Using Ajax ,Server-Side Scripting ,Choosing a server-side scripting language ,Connecting to a script on a server, Setting up a Web page to read XML ,Handling the XML you read from the server, Extracting data from XML ,Passing Data to the Server with GET, Passing Data to the Server with POST.

Ajax in Depth

Returning JavaScript from the Server, Calling a Different Domain , Reversing the Roles: Performing Validation on the Server, Getting Data with HEAD Requests., Returning all the header data you can get ,Finding the last-modified date, Debugging Ajax ,Using GET to get text ,Using GET to get XML ,Using POST to post data and get text ,Using POST to post data and get XML.

Unit References

Code :

Dummies(Ch.1 ,3,4,5,10)

Unit IV[15 lectures]

Handling XML in Ajax Applications

Requesting XML Data in Ajax., Extracting XML Data Using Properties ,Right on the node ,Introducing the JavaScript properties, Navigating an XML document using JavaScript properties, Extracting with node Value, Accessing XML Elements by Name, Accessing Attribute Values in XML Elements, Validating XML Documents in Ajax Applications

Working with Cascading Style Sheets in Ajax Applications

An Ajax-Driven Menu System, Setting up the styles, Handling mouse events, Displaying a menu ,Hiding a menu ,Handling the menu items ,Displaying Text That Gets Noticed ,Styling text, Handling colors and backgrounds, Positioning using styles

Ajax Design Issues

Breaking the Back Button and Bookmarks, Giving Visual, Cues, Leaving the User in Control ,.remembering All the Different Browsers, Showing Users When Text Changes, Avoiding a Sluggish Browser ,Handling Sensitive Data, Creating a Backup Plan., Showing Up in Search Engines, Sidestepping a Browser's Cache

Unit References

Code:

Dummies(Ch. 8,9,11)

- References:**
1. **ELJO:** Using HTML 4, XML & JAVA by Eric Ladd & Jim O'Donnell. (Platinum Edition) (PHI)
 2. **PWD:** Principles of Web Design by Joel Sklar
 3. **JSDG:** Java Script the definitive guide by David Flanagan
 4. **Dummies:** Ajax for Dummies, Steve Holzner, PhD, Wiley Publishing Inc
 5. **Unleashed:** XML Unleashed Techmedia SAMS, Michael Morrison

Additional Ref :

1. Ajax in Action, Dave Crane, Eric Pascarello, Darren James
2. Beginning javascript, Wilton, Wrox Publication
3. Head first HTML with CSS and XHTML, Elisabeth freeman and Eric freeman, SPD O, reilly
4. AJAX For Beginners, Ivan Bayross And Sharanam Shah, SPD The team

URLs:

<http://www.w3schools.com>

<http://www.webmonkey.com>

Applied Component II – Dot Net Technologies

Unit I [15 lectures]

Introduction to .NET Framework 3.5(or above): Overview of .NET Framework, Objectives, Main components of .NET Framework and their overview, Types of Applications

.NET Framework Architecture– CLR(Goal of CLR, Services/Features, Benefits, Managed Execution Process, Automatic memory Management), CTS(CTS Overview, Type Definitions, Type members, Different types of data such as class, delegates, pointers, arrays, interfaces), Meta Data, Structure of Metadata & Self Describing Components, Cross Language Interoperability & CLS, Assemblies(Assembly overview, Benefits, Contents, Types)

Ref : 1. MSDN

Introduction to .NET IDE: [2 Sessions] [Ref1: &]

Introduction to VB 2008 : Adding forms, controls, Setting Properties, Adding code, Handling events, Displaying simple messages, Data Types, Declaring variables, Strings & constants, Operators, Expressions, Declaring methods, subroutines, procedures, Passing & returning Arguments, Decision Statements (if, select), Loops, Adding Comments, Converting Data types [4 sessions] [Ref1: Chap1,2,3, 100-112,116-123,142-149,152-157,168-175, Ref2: Pg 1-32, 35-75,85-115]

Ref : 1. *Murach' Visual Basic 2008, Anne Boehm, Murach (Chapter 1, 2, 3, 4)*
2. *Mastering Visual Basic 2008, Evangelos Petroustos, Wiley-India Edition (Chapter 1, 2, 3)*

Working with Strings, Dates & Time : Char, String class & Functions, Converting strings to numbers, DateTime class, Formatting Dates[Ref1:Pg 264-279, Ref2: Pg 461-473,481-492]

Window Controls and Events: Using basic window controls such as forms, labels, buttons, text boxes, check boxes, radio buttons, list boxes, combo boxes, Adding properties, Processing events, Using various dialog boxes such as MessageBox, OpenFileDialog, SaveDialog, StreamReader & StreamWriter, Using menus, Adding toolbars, status bars, MDI form, Processing events, Adding event handlers for one/many events [Ref1:Pg176-185,294-303,306-317,666-669,730-731,736-751,Ref2:Pg173-190,195-209,217-246,253-263,267-279,572-576]

Structured Exception Handling : try, catch, finally blocks, throwing exceptions, Err object, Using masked textboxes [Ref1:Pg 190-203,218-219, Ref2:Pg147-149]

Collections : Creating & manipulating arrays, Using System.Array, ArrayLists Collection, [Ref1:Pg 224-235,240-243,246,251,258-259,Ref2:Pg 499-516]

Ref : 1. *Murach' Visual Basic 2008, Anne Boehm, Murach (Chapter 1, 2, 3, 4, 5, 6, 7, 9, 10, 24)*
2. *Mastering Visual Basic 2008, Evangelos Petroustos, Wiley-India Edition (Chapter 1,2,3,4, 6,7,8,13,14, 15)*

Additional Ref : 1. *Murach's VB.NET Programming with ADO.NET*

Unit II [15 lectures]

OO Programming : Understanding objects, creating classes, adding constructors, properties, methods & variables, access specifiers, Shared members, Defining & using events, Implementing inheritance, Partial classes, Creating, referencing, importing namespaces [Ref1:Pg 332-351,550-551,554-555,580-582,640-643, Ref2:Pg. 349-363,375-383,395-426]

Building Class libraries : Understanding class libraries, using strong names, registering assemblies, designing class libraries [Ref3:Chapter13]

Creating Custom controls : Enhancing Existing controls, Building compound controls, Adding custom events [Ref2:Pg. 429-442,450-452]

ADO.NET : ADO.NET & Data management, Advantages of ADO.NET, ADO.NET Object model, Data objects, Data Source Interaction objects, .NET Data provides [Ref1:Pg 414-425, Ref4:Pg486-492]

Using Connection, Command, DataReader classes, Queries returning result sets, scalars, Passing parameters in queries [Ref1:Pg 506-519, Ref2:Pg806-822]

Disconnected Data, Data Adapter, Using Data Set(Typed), Data Table, Data Row & Data Column, Command Builder, Modifying & Updating disconnected data [Ref2:Pg822-843,845-854]

Creating and using Data sources, Binding(Simple and Complex binding) controls with data sources, DataGridView Control, Role of BindingSource, TableAdapter, AdapterManager & BindingNavigator classes [Ref1:Pg 428-451,458-459,470-479,488-493,Ref2:Pg. 855-876]

LINQ : Introduction to LINQ, Advantages of LINQ, Using From, Where, Order By, Select [Ref1:Pg 704-715]

- Ref :
1. Murach' Visual Basic 2008, Anne Boehm, Murach (Chapter 8, 11, 13,14,15,16,17,18,19, 20, 23,25)
 2. Mastering Visual Basic 2008, Evangelos Petroustos, Wiley-India Edition (Chapter 10,11,12,17, 22,23)
 3. Beginning Microsoft Visual Basic 2008(Wrox) by Thearon Willis & Bryan Newsome (Chapter 13)

Additional Ref : 1. Murach's VB.NET Programming with ADO.NET

Unit III [15 lectures]

ASP.NET Applications – Evolution of Web Development [Ref1:Pg1-10], Creating ASP.NET Applications, Designing Web pages, Anatomy of web form[Ref1:Pg 81-99], Writing Code-behind and event handlers, [Ref1:Pg105-118], ASP.NET Files, Application Directories, Server Controls, HTML Control classes, Page Class, Global.asax files and application events, ASP.NET Configuration files[Ref1:Pg121-159]

Web Controls – Advantages of web controls, Web control classes, AutoPostBack & Web control events, [Ref 1 : Pg 163-199]

State Management – Maintaining state using ViewState [Ref1:Pg201-206], Query String, Cross Page Posting, URL Encoding, Cookies, Sessions State[Ref1:Pg209-230], Application State[Ref1:Pg235-236]

Validation & rich controls – Validations & Validator controls, Undertaking regular expressions [Ref1:Pg321-340], Calendar control, AdRotator, Advertisement file, AdRotator class [Ref1: Pg343-353]

References

1. Beginning ASP.NET 3.5 in VB 2008, From Novoice to professional, Second edition, Mathew Mcdonald (Chapters 1,4,5,6, 7, 9,10,11)

Unit IV[15 lectures]

ADO.NET & Data Binding – ADO.NET Fundamentals[Ref1:486-522], Single-value, Repeated-Value Data Binding, Data binding with ADO.NET, Data source controls[Ref1:-525-558], GridView, Defining columns, Selecting, Sorting & Paging GridView[Ref1:Pg565-579,584-589]

Using XML – XML Role in .NET, XML Classes [Ref1:Pg635-636,642-658]

Protection & Performance : Determining security requirements, ASP.NET Security model [Ref1:Pg 679-686], Caching, Types of caching, Example of output caching, data caching,[Ref1:Pg 809-813,819-822]

AJAX in ASP.NET –Using ScriptManager, Partial refreshes, UpdatePanel, Triggers, Timed Refreshes [Ref1-843-849, 852-857, 861-863]

Web Service – What is web service, ASP.NET Web services, Creating a simple web service, Consuming Web service [Ref2-Pg 981-982,984-990] (**Ref - Mastering VB 2008 Chapter 27**)

References

1. Beginning ASP.NET 3.5 in VB 2008, From Novoice to professional, Second edition, Mathew Mcdonald (Chapters 13, 14, 15,16, 17, 19, 20, 24,25)
2. Mastering Visual Basic 2008, Evangelos Petroustos, Wiley-India Edition (Chapter 27)

Additional References

1. Beginning ASP.NET 3.5: In C# and VB (Programmer to Programmer)
By Imar Spaanjaars
2. Murach's ASP.NET 3.5 with VB2008
3. ASP.NET 3.5 Application Architecture & Design –Vivek Thakur(SPD-PACKT)

Group I AC : Web Technologies

List of Practicals

- 1 Study of Basic and Advanced HTML Tags
- 2 Applying CSS, Representing Data using XML
- 3 Executing Client Side Scripts using JavaScript
- 4 Using AJAX for enhancing web-sites

Group II AC : DotNet Technologies

Note : Demo on using .NET IDE for building .NET Projects, IntelliSense, Running & Debugging Application should be given.

List of Practicals

- 1 Study of basic & advanced VB.NET Programming alongwith controls, Data Conversion & Message box, MDI, Menus, Toolbars, Dialog boxes & Collection
- 2 Implementing OOP concepts in VB.NET, Creating Custom Controls, ADO.NET Programming & Data Binding
- 3 Fundamentals of ASP.NET such as using HTML/Web Controls, Autopostback, Application events, configuration files, State management, Validation & Rich controls
- 4 ADO.NET in ASP.NET with Data Binding, Interacting with XML documents, Performance improvement using Caching, Creating & Consuming web services

Suggested List of practical

Gr I – DBMS II

- (1) Demonstrate the transactions, locks, save points and deadlocks
- (2) Write PL/SQL block that demonstrates (i) conditional and iterative statements,
- (3) Write PL/SQL block that demonstrates stored procedures and functions.
- (4) Write PL/SQL block that demonstrates (i) how to pass parameters in stored procedures and functions, (ii) an exception handling: Named system exceptions, unnamed system exceptions and user-defined exceptions.
- (5) Write PL/SQL block that demonstrates implicit and explicit cursors.
- (6) Write PL/SQL block that demonstrates Cursor for and cursor variables.

AC1

Study of Basic and Advanced HTML Tags

Category A

Study of HTML tags to develop a website on My Profile having following web pages -

Home Page with about you with a appropriate image and 15 lines introducing you with hyperlinks to
About your + people who have made difference to your life
About your friends
Your dreams and aspirations
10 things you wish in life
10 things you don't wish to do but you have to do!
Unforgettable moments in your life!
Your skills or services

Create a **registration form** wherever people can register with you asking for your services or skills.
Use appropriate images , phrases ,imagemaps, table format. Do appropriate formatting on every page.

Category B

Applying CSS, Representing Data using XML

Study of Cascading Style Sheets and XML

- Create a stylesheet for above website to apply uniform background, forecolor, headings color ,contact details to all pages. Add more if you wish to.
- Create an XML documents with XSL and DTD listing your favorite books or describing your hobbies and interest and relevant activities. Link it above web page .

Category C

Executing Client Side Scripts using JavaScript

Add Javascript validations in above assignments wherever needed .Use regular expressions.

Category D

Using AJAX for enhancing web-sites

- I. Getting login feedback using Ajax
- II. XML and Ajax
- III. CSS and Ajax
- IV. Ajax and PHP

AC2 Practical

VB.NET

Category E

Study of basic & advanced VB.NET Programming alongwith controls, Data Conversion & Message box, MDI, Menus, Toolbars, Dialog boxes & Collection

1. Design a Login Form containing User Name and password. The password should contain max 8 characters. When user name and password matches with predefined values, a welcome message should be displayed otherwise error message should be displayed. Maximum 3 attempts should be allowed for wrong passwords otherwise the application should end[Use If]
2. Create a form that accepts 2 numbers from 2 text fields, an operation(+,-,*,/) from third text field. When you click “Result” button, the result of the expression should be displayed in 4th disabled text-field. Include a radio button to choose whether the result should be integer or float. [Use Select]
3. Create a VB.NET Project that accepts Principle Amount, No. of Years & Rate of Interest from 3 text fields, when you click “Calculate Interest” button, the data is sent to a function that returns the simple interest. When you click on “Final Amount” button, the final amount by adding principle amount and interest should be displayed. [Use Functions]
4. Create a reservation form for Mumbai-Pune journey, containing 3 text-fields to enter names, 3 text-fields to enter age and a text field to show final bill. It should also contain a check box showing the type of journey(AC or NonAC). Charges of AC/NonAC mode of journey is fixed. But only for children(age <5) and senior citizens(age>60), the rates are half. 4% service charges are applied on final amount. As per the passengers entered by user, display the final bill.
5. Create a form containing a list box with names of Indian cricket players. From this list, two teams should be formed called “Royal Challengers” & “Knight Riders”. The players of these teams should be shown in combo boxes which are initially empty. For each of these combo-box, two buttons – “Add” & “Delete” should be used that allow to make changes When you click on Add button of a particular team, the selected players from the main list box, should be added in the combo box. The same players should be removed from the main list box. Make sure that the number of players should not exceed 11. When you click on the delete button, a particular player from the combo-box should be deleted and added to the main list box.
6. Write a program to enter information about customer with name, age and email in 3 text fields. Name text field should not accept any digit, age text field should not accept characters and perform validations on email on lost focus of text field.

7. Write a program to accept information of customer for an investment policy such as Name, Date of Birth and Address. The amount to be invested should be selected from a combo box. A customer can invest from min. age of 21 to 60. According to Date of birth, determine current age of customer, total number of years remaining and accordingly find & display the premium that customer will have to pay.
8. Create a form containing 2 buttons to open color dialog and font dialog box. The form should contain a label. The label's font and color should be set as per the options selected in the font and color dialog box.
9. Create a form containing a text area and two buttons "Read" & "Write". When you click on Read button, File-open dialog box is opened in which when you select a text file its contents should be displayed in text area. When you click on Write Button, Save-File dialog box is opened in which you can select a text file in which the contents of text area will be written.
10. Create a MDI form containing 2 menus – Current Releases & Forthcoming. Current Releases should contain 2 sub-menus – Hindi & English. Each menu opens a form containing some list of specific films in combo-box. When you select the name of the film, its information such as star-cast, movie type(comedy/suspense/action/drama etc), production etc should be displayed in labels. It should also show its ratings in the status bar. When you click on "Forthcoming films", it should open a form containing some names of films in list-box. The list of films should be specified in array-list.

Category F

Implementing OOP concepts in VB.NET, Creating Custom Controls & ADO.NET Programming & Data Binding

1. Design a custom control called "FileSelector" containing a TextBox and Browse button. When you click on the button, file dialog should be opened using which one can select a file whose name is displayed in text box. Add two properties in the custom control called "Ext" that selects files with specific extension and "DefaultDir" that sets initial directory of file dialog. Also include an event called "FileSelected" which is fired when user selects a file using Browse button.
2. Create a class Account containing 3 variables – accno, name, curbal. Add suitable constructors to create Account objects. Add 3 properties – AccNo, Name and CurBal. AccNo should be read-only property whose value should be automatically assigned by using static variable. Add a function called CheckStatus that displays account number along with current balance. Design a form containing 3 text-fields to show account number, name and current balance with suitable labels. Also add Account class in BankApp namespace.
3. Using Account class created in Practical 10. Add 2 functions in it called withdraw and deposit which have integer parameter. Function deposit adds amount in current balance. Function withdraw is an abstract function. Create 2 subclasses of account – SavingsAcc & CurrentAcc. SavingsAcc should contain a variable representing minimum balance and a constructor to initialize it. It overrides withdraw function which deducts some amount from current balance only if remaining balance is greater than minimum balance. CurrentAcc should contain a variable representing overdraft and a constructor to initialize it. It should also override withdraw function which deducts some amount from current balance only if remaining balance is greater than 0 or money that you want to withdraw is greater than current balance plus overdraft.
4. For an Employee table containing EmpNo, EmpName & EmpSal, design a form that allows user to go through all employees using suitable button. Also include buttons that show total number of employees and maximum salary. [Use Data Reader]

5. For students table, containing Roll, Name and Class, design a form that allows add, modify and delete operations using suitable buttons on the table. Provide navigation facility to access First, Last, Next & Previous records. Also add searching & sorting facilities on specified columns. The result of search operation should be displayed in grid. [Use currency manager & disconnected model]
6. Assuming 2 tables - Dept(DeptNo, DeptName) and Employee(EmpNo, EmpName, EmpSal, DeptNo) where each employee belongs to a department. Display list of departments in combo box using complex data binding. When user selects a department, all employees from that department should be displayed in Grid. Also add a "Print" button that displays the list of employees in selected department using crystal report.

ASP.NET

Deploying ASP.NET Applications – Web Server, Role of IIS & its settings, Configuring projects, Deploying [Demo]

Category G

Fundamentals of ASP.NET such as using HTML/Web Controls, Autopostback, Application events, configuration files, State management, Validation & Rich controls

1. Create a web site of your name that shows your information. (<http://localhost/UserName>)
2. A software company wants to conduct placements for graduates in Mumbai or Pune. Design an HTML page to input student details such as name using textbox, course name such as BSc Comp Sci/IT/Phy/Maths using radio button, Marks in SSC,HSC, FY & SY along with Year of Passing using text boxes & Location such as Mumbai/Pune using combo box. The student is shortlisted only if he/she has min 60% in SSC & HSC, FY & SY average should be min 55% & there should not be any gap in education. When student clicks on Register button, the data is submitted to ASP.NET page which informs the student whether he/she qualifies and place of interview in Mumbai or Pune as given by the student.
3. A bank wants to keep an enquiry page for various types of loans that it provides - such as Home Loan, Car Loan, Education Loan. The rates of these loans are stored in configuration file. The user selects the type of loan from combo box, aprox range of loan amount from combo box, range of monthly salary from combo box and number of years of loan repayment from combo box(5 to 10). In return, the user gets information of the rate of loan, monthly installment for the specified number of years and total number of enquiries since the server started[Use configuration files and application events]
4. Design ticket enquiry form for a theater. Select location (Mumbai/Pune) using radio button. When user clicks a location, it fills a combo box with names of theaters in that city. When user selects the name of the theatre, the list of films currently shown and their show timings should be displayed in table[Use autopostback].
5. A news channel wants to conduct a survey of some famous personalities of the year. The user initially inputs his/her name, age and email. The survey will be valid only if user is above 18 years of age and has an email id. First page allows user to select Best Sportsperson, 2nd page asks Best Writer and the third – Best Minister. At the end, it shows a thank you message with user's name and shows all the choices made by him/her.
6. For program 5, add validations – name should not be null, age should be within (21 to 100) & Email should be in specific format.

7. For program 4, show advertisements of any 3 popular products/companies.

Category H

ADO.NET in ASP.NET with Data Binding, Interacting with XML documents, Performance improvement using Caching, Creating & Consuming web services

1. Assuming that there are 2 tables – Cust(AccNo, HolderName, Password, CurrBal) & Transactions(TransId, AccNo, Date, Amt, TransType, ClientName) where TransType can be Debit or Credit. User should input AccNo and password. For successful login, it should show welcome message with the user's name, current balance and transactions of the current month in table. [Use Reader]
2. Develop a web page for a real estate firm that accepts information of flats to be sold such as City, No. of Rooms, Expected Price and stores it in a database. Another web page that shows a combo box containing the list of cities. When you select a city, show the flats available in that city. [Use data binding and data source].
3. Create a website that allows user to login. For successful login, the list of jobs should be displayed in grid. At a time 10 records should be displayed. When user selects a job, its detailed information should be displayed[Use GridView]
4. A Cable TV provider stores the list of channels in an XML File. For each Channel, there is an attribute "Name". The Channel element consists of sub-elements such as Language(such as Hindi, English, Marathi etc), Category(Sports, Movies, Cartoon etc). Design an ASP.NET page that displays, the list of languages and categories in 2 combo boxes. When user clicks on a button, all the channels matching the selected criteria should be displayed.
5. For program 4, store the output of the first page in cache. When user selected city, the names of theatres in the city should also be stored & read from cache(Use Output & Data Cache).
6. A channel displays online news. Top 3 news are shown in links. It also shows score of current day's cricket match which gets updated after every 60 seconds[Use AJAX].
7. Create a web service that displays – (i) NSE Index, (ii) BSE Index, (iii) Gold Rate, (iv) Petrol Rate(for 4 metro cities) of a particular city which is passed by user.