5.1   COMPUTER NETWORKS
(Common with Information Technology)

L   T   P
3   -   3

RATIONALE

The future of computer technology is in computer networks. Global connectivity can be achieved through computer networks. It is important to understand the function of computer networks. Knowledge about hardware and software requirements of networks is essential. The emphasis of the course is towards the various components and software required to make a network operational

DETAILED CONTENTS

1.   Networking Basics   (8 hrs)

Definition of network, Models of network computing, Network models, LAN, MAN and WAN, needs and goals of networking topology, network architecture, need for protocols, OSI Reference Model, layer services, primitives and service access points.

2.   Data Link Layer   (5 hrs)

DLL design issues, elementary data link protocols, sliding window protocols

3.   Network Layer   (5 hrs)

Brief discussion on need for network layer, routing algorithm, congestion and its control methods, internetworking

4.   Transport Layer   (5 hrs)

Transport service primitives, quality of service, barkeley sockets, elements of transport protocols

5.   Session Layer   (5 hrs)

Functioning of session layer, OSI primitives, retrotic procedure calls

6.   Data Compressing   (4 hrs)

Huffman arithmetic codes, data encryption, public encryptography and its uses

7.   Presentation Layer   (4 hrs)

Presentation layer primitives, function of presentation layer

8.   Application Layer   (6 hrs)

Application layer design issue, file transfer and management, E-mail, virtual terminal

9.   Network Connectivity   (6 hrs)

-       NICs, hubs, switches, repeaters, multiplexers, modems, routers

LIST OF PRACTICALS

1.   Identification of various networks components
        -       connections, BNC, RJ-45, I/O box
        -       Cables, Co-axial, twisted pair, UTP
        -       NIC (network interface card)
        -       Switch, hub

2.   Sketch wiring diagrams of network cabling considering a computer lab of 20 systems

3.   Interfacing with the network card (Ethernet)

4.   Preparing of network cables

5.   Establishment of a LAN

6.   Use of protocols in establishing LAN

7.   Trouble shooting of networks

8.   Installation of network device drivers

9.   Installation of networks (Peer to Peer Networking client server interconnection)

10.   Use/installation of proxy server

RECOMMENDED BOOKS

1.   Computer Networks by Tanenbaum, Andrew S, Prentice Hall of India, New Delhi

2.   Data Communications and Networking by Foronzan, Tata McGraw Hill, New Delhi

3.   Local area Networks by Peter Hudson

4.   Understanding Local area Network by Neil Jenkins

5.2   VISUAL BASIC
(Common with Information Technology)

L T P
3 - 6

RATIONALE

VB is a programming language, which enables a programmer to write programs and develop application packages to produce solution to live problems. After undergoing this course, the students will be able to understand the principles of Active-X objects and write programs in VB.

DETAILED CONTENTS

6.   Introduction to Visual Basic   (15 Hrs)
        Features and applications of VB – concept of integrated development environment (IDE) – project application like standard Exe

2.   VB Structure   (4 Hrs)
        Variable declaration types – user defined data types – scope and life of a variable – arrays – constructors – control flow statements – procedures and functions.

3.   Designing the User Interface   (6 Hrs)
        Design aspects of VB forms – Elements of user Interface – properties of controls – textbox, label, command button, check box, list box, picture, image shape timer – designing forms and displaying messages using above controls – control arrays.

4.   Menus and Common Dialogue Control   (6 Hrs)
        Creating menus at design time using menu design window – control menus and runtime – create shortest keys for pop up menus – common dialogue control.

5.   Display date, time, string type conversion and Printing Information   (6 Hrs)
        Data reports and environments – display tabular data in report form– fundamentals of printing – printing with print form method.

6.   Data Base Programming   (6 Hrs)
        Connecting with database, using DAO, RDO and ADO

7.   Working with inbuilt Active X, Windows common control, creating own Active X through Active X control, Active X EXE, difference between EXE and DLL   (5 hrs)

LIST OF PRACTICALS

1)   Exercise on opening projects like standard Exe, Active-X EXE and Active-X control

2)   Exercise on all the menus of opening window of VB

3)   Exercise on all basic controls

4) Exercise on design form like calculators, traffic lights

5) Exercise on small application using appropriate commands

6) Exercise on menus

7) Writing programs using arrays

8) Exercise on creating reports

9) Exercise on Data base connectivity

10) Exercise on creating own active X, component

INSTRUCTIONAL STRATEGY

This subject deals with the programming concept of VB and the subject is having both theory and practical. While imparting instructions to the students, the teacher should stress on the usage of various built in Active-X Controls, DLL files so that with the help of which the students can develop application packages of their own

RECOMMENDED BOOKS

1.   Mastering VB, by Evangelous Petroustsos BPB Publications, New Delhi

2.   Teach Yourself VB by Techmedia Publications, New Delhi

3.   Microsoft VB Manual by MS Press

4.   Visual Basic & .Net by Null Dale, Michael Mc Millan, Chip Weems, Mark Headington, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

Elective - I
5.3 (a) ORACLE
(Common with Information Technology)

L T P
3 - 6

RATIONALE

This course will provide students the knowledge of Relational Database Management (RDBMS) using ORACLE. After completion students will be able to create data basis according to their requirements along with the capabilities of modifying database, providing securing with the help of access permissions etc.

DETAILED CONTENTS

1.   Introduction to Managing Data   (4 hrs)

Understand human data: Cell name, cell length; Basic database concepts; Oracle – The product philosophy; Introduction to oracle and its tools; The oracle database administrator; Interaction between oracle engine and oracle client tools; Commercial application development using oracle – oracle's suite of products

2.   Interactive SQL   (8 hrs)

Oracle and client server technology, invoking SQL and PLUS, data manipulation in DBMS (Table, Entity), Data types in ORACLE, creation of TABLE, creating fable from a table

Insertion of data into a table, viewing data in the tables, deletion operations, updating the contents of a table, modifying the structures of tables (adding new columns) modifying existing columns etc., Renaming tables, destroying tables, examining objects like table, views created by a user

3.   More on SQL   (12 hrs)

Computations on Table data: Arithmetic operators, logical operators, renaming columns used with expression lists, range searching, pattern matching

SYSDATE

Oracle Functions: Group functions (Aggregate functions), scalar function (single row function), date conversion functions

Data constraints: Types of data constraints, column level constraints, table level constraints, NULL value concepts, the UNIQUE, PRIMARY KEY, FOREIGN KEY AND CHECK constraint, defining and dropping constraints in the ALTER TABLE command, default value concept etc

Group by clause, HAVING clause

Manipulating Dates in SQL: TO-CHAR, TO-DATE

SUBQUERIES, JOINS (EQUI JOIN AND SELF JOIN), UNION, INTERSECT AND MINUS clause

4.   SQL Performance Tuning   (9 hrs)

INDEXES: Creation of simple, composite and unique index, dropping indexes

VIEWS: Creation of views, renaming the columns of a view, selecting a data set from a view, up-date-table views, destroying a view

SEQUENCES: Creating sequence referencing a sequence, altering a sequence, dropping a sequence

5.   Security Management Using SQL   (3 hrs)

GRANT AND REVOKE Commands

6.   Introduction to PL/SQL   (6 hrs)

Advantages of PL/SQL, syntax of PL/SQL block, PL/SQL (characterset, leterals, data types, variables, constants, logical comparisons, displaying user messages on screen comments, conditional and iterative control

7.   More on PL/SQL   (6 hrs)

ORACLE TRANSACTIONS: Closing transactions, creating savepoint

CURSORS: Types of cursors, implicit cursor and explicit cursor, opening a cursor, cursor for loops, parameterized cursors

LIST OF PRACTICAL

1.   Exercises on different forms of select statement

2.   Exercises on group by and having clause

3.   Exercises on creation of tables

4.   Exercises on creation of tables using constraints

5.   Exercises on insertion of data into tables

6.   Exercises on deletion of data using different conditions

7.   Exercises on UPDATE statement

8.   Exercises on SUBQERIES

9.   Exercises on Indexes, views and sequences

10.   Exercises on data functions, group and scalar functions

11.   Exercises on JOINS, Grant and remove privileges

12.   Exercises on creation of PL/SQL blocks

13.   Exercises on cursor management in PL/SQL

14.   Write a database trigger after update, delete

15.   Write a database before delete, update

INSTRUCTIONAL STRATEGY

The teacher should use examples for explaining various concepts. They can give laboratory assignments on different topics as mentioned under list of practical

RECOMMENDED BOOKS

1.   SQL, PL/SQL by Ivan Bayross; BPB Publications, New Delhi

2.   ORACLE "The Complete Reference" By George Koch and Kevin Loney; Tata McGraw Hill, New Delhi

5.4   INTERNET AND WEB DESIGNING

L   T   P
3   -   4

RATIONALE

This course will enable the students to understand the basics of internet and various application of internet like e-mail, FTP, Telnet, Newsgroups and video conferencing In addition, this course develops competency amongst the students to design professional web sites and interactive web pages. They will have overview of different technologies like of HTML, DHTML, XML, CGI, ASP, JSP, Java Scripts, VB Scripts.

Note:

Since this subject is practice-oriented, theoretical instructions may be given during the practical sessions/class. The detailed contents have been given to have an idea about the exercises to be done in practical class.

DETAILED CONTENTS

1.   Internet Basics   (6 hrs)

Concept of internet and its evolution, Application and use of internet in various fields of Science and Technology, Specification and technical details for establishing Internet.

Types and functions of modems, IP addressing, internet domains, domain name server, TCP/IP protocols, Internet service providers, Intranets

2.   Internet Connectivity   (4 hrs)

Telephone line, cable, leased line, ISDN, VSAT, RF link

3.   World Wide Web (WWW):   (6 hrs)

World Wide Web and its evolution, web page, web server, HTTP protocol. Examples of web servers.

Navigation Tools: Netscape and Internet Explorer to surf Internet, Uniform Resource Locator (URL)

Hypertext, hyperlinks and hypermedia, URL, its registration, browsers, search engines, proxy servers

4.   Internet Applications: (4 hrs)

E-mail, Telnet, FTP, IRC, NNTP, Video conferencing, e-commerce

5.   Developing Portals Using HTML   (6 hrs)

Basic structure of HTML, designing a web page, inserting links images, horizontal rules, comments. Formatting text, title, headings, colours, fonts, sizes, simple tables and forms.

HTML tags, hyperlinks. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and frames

6.   Using Front Page   (4 hrs)

Front page editor, Front page explorer

7.   Client-side Scripting: VB Scripting Vs Java Script,   (4 hrs)

8.   Introduction to Java Scripts, event handling, verifying forms, working with browser windows, cookies,   embedding with HTML

9.   Server-side Scripting: Scripting methods,   (4 hrs)

10.   Java Server Pages (JSP)   (4 hrs)

11.   Active Server Pages (ASP)   (4 hrs)

Text processing using ASP, Handling server/Client requests, Accessing databases, using IIS web server; ASP Objects

12. Developing Interactive Web Pages using Java scripts/VB Scripts/Java script/ASP/ JSP/CGI
                                                                                (6 hrs)

LIST OF PRACTICALS

1.   Configuring computer system to access internet

2.   Using e-mail

3.   Using WWW for accessing relevant information

4.   Using Telnet

5.   Using FTP

6.   Using IRC

7.   Creating Web pages using HTML

8.   Creating web pages using front page

9.   Demonstration of audio-video conferencing

10.   Demonstration of e-commerce transaction

11.   Design of Forms using Java Script or Visual Basic Script

12.   Validation of user queries and responses in the Forms using Java Script or VB script

13.   Create a Homepage with frames, animation, background sound and hyperlinks

14.   Design Shopping Cart for e-commerce applications

15.   Develop hitometer for each client i.e. number of visitors. Visit to a site.

16.   Designing simple server side program which accept some request from the client and respond

17.   Establishing sessions between servers and clients

18.   Design fill-out form with text, check box, radio buttons etc and embed Java script or VB script to validate users input.

19.   Develop simple server side program in ASP (Active server pages) which accept some request from the client and respond.

20.   Develop interface with database (MS-Access etc) for online retrieval and storage of data through HTML form.

RECOMMENDED BOOKS

1.   Internet 6-in-1 by Kraynak and Habraken, Prentice Hall of India Pvt. Ltd., New Delhi

2.   Using the Internet IV edition by Kasser, Prentice Hall of India Pvt. Ltd., New Delhi

3.   Using the World Wide Web, (IInd edition) by Wall, Prentice Hall of India Pvt. Ltd., New Delhi

4.   Internet for Everyone by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi

5.   Practical Guide and Internet by AB Tiwana; Galgotia Publications Pvt. Ltd., New Delhi

6.   HTML – 4 for World Wide Web by Castro Addison Wesley (Singapore) Pvt. Ltd., New Delhi

7.   Principles of Web Designing Joel Sklar, Web Warrior Series Available with Vikas Publishing House Pvt. Ltd., New Delhi

8.   HTML 4.0 Unleashed by Rick Dranell; Tech Media Publications

9.   Teach Yourself HTML 4.0 with XML, DHTML and Java Script by Stephanie, Cottrell, Bryant; IDG Books India Pvt. Ltd., New Delhi

10.   Dynamic Web Publishing – Unleashed Tech Media

11.   Using Active Server Pages by Johnson et.al. Prentice Hall of India, New Delhi

12.   Web Development with Visual Basic with CD ROM by Chapman; Prentice Hall of India, New Delhi

13.   Java Server Pages (JSP) by Pekowsky Addison Wesley (Singapore) Pvt. Ltd., New Delhi

14.   Active Server Pages (ASP) by Keith Morneau Jill Batistick Web Warrier Series Available with Vikas Publishing House Pvt. Ltd., New Delhi

15.   ASP Unleashed Tech Media Publication

16.   JSP O'Reilly SPD Publishers Hans Bergsten

17.   Java Script in 24 hrs Tech Media Publications

18.   Java Servlets by O'Reilly SPB Publishers

5.5   SOFTWARE ENGINEERING
(Common with Information Technology)

L T P
3 - -

RATIONALE

This subject will enable the diploma students to have awareness about software engineering, various matrics, planning about software, cost estimation, software design etc.

DETAILED CONTENTS

1.   Introduction to Software (S/W) Engineering   (6 hrs)

Introduction, size factors. Quality and productivity factors. Management issues, models and waterfall, spiral, prototyping, fourth generation techniques, s/w process

2.   Software Matrics Engineering   (6 hrs)

Size, function, design, oriented matrics, halstead software science Mcafe complexity

3.   Planning   (6 hrs)

The development process, an organizational structure, other planning activities

4.   Software Cost Estimations   (6 hrs)

Cost factors, cost estimations techniques. Staffing level estimation, estimating software maintenance costs, COCOMO

5.   Software Requirements Definition   (6 hrs)

Problem analysis, requirement engineering. The software requirements specifications (SRS), formal specifications techniques, characteristics of a good SRS

6.   Software Design and Implementation Issue   (6 hrs)

Fundamental design, concept design notations, design techniques, structured coding techniques coding styles, documentation guidelines

7.   Verification and Validation Techniques   (6 hrs)

Quality assurance work through and inspections static analysis, symbolic execution unit testing, formal verifications. Black box and white box testing techniques

8.   Maintenance Overview   (6 hrs)

Configuration management

RECOMMENDED BOOKS

1.   Software Engineering Concept by Richard Fairley, Tata McGraw Hill Publishers, New Delhi

2.   An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

3.   Software Engineering – A Practitioner's Approach by RS Pressman, Tata McGraw Hill Publishers, New Delhi

4.   Software Testing Techniques by B Beizer

5.   Software Engineering by KK Aggarwal and Yogesh Singh

6.   A Software Engineering Approach by Peter A Darnell, Phillips E, Moglis, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

5.6   MINOR PROJECT WORK

L T P
- - 3

Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with industrial environment at the shop floor and possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of four weeks at a stretch in different industries. Depending upon the interest of students they are sent for exposure to:

1) Industrial practices in installation and maintenance of computers and computer networks
2) Fabrication of computers
3) Fault diagnosis and testing of computers
4) Industrial practices in respect of documentation and fabrication
5) A variety of computers and peripherals in assembly organisations
6) Software package development organisations

Note:
> **The teachers may guide /help students to identify their minor project work and chalk out their plan of action well in advance.**

As a minor project activity each student is supposed to study the operations at site and prepare a detail project report of the observations/processes/activities by him/her. The students should be guided by the respective subject teachers, each teacher may guide a group of 4 to 5 students.

The teachers along with field supervisors/engineers will conduct performance assessment of students. Criteria for assessment will be as follows:

	Criteria	**Weightage**
(a)	Attendance and Punctuality	15%
(b)	Initiative in performing tasks/creating new things	30%
(c)	Relation with people	15%
(d)	Report Writing	40%