

5.1 COMPUTER NETWORKS

(Common with Computer Engineering)

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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

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| 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, Berkeley sockets, elements of transport protocols | |
| 5. | Session Layer | (5 hrs) |
| | Functioning of session layer, OSI primitives, retroc procedure calls | |
| 6. | Data Compressing | (4 hrs) |
| | Huffman arithmetic codes, data encryption, public cryptography and its uses | |
| 7. | Presentation Layer | (4 hrs) |
| | Presentation layer primitives, function of presentation layer | |

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| 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 Computer Engineering)

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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

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| 6. | Introduction to Visual Basic
Features and applications of VB – concept of integrated development environment (IDE) – project application like standard Exe | (15 Hrs) |
| 2. | VB Structure
Variable declaration types – user defined data types – scope and life of a variable – arrays – constructors – control flow statements – procedures and functions. | (4 Hrs) |
| 3. | Designing the User Interface
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. | (6 Hrs) |
| 4. | Menus and Common Dialogue Control
Creating menus at design time using menu design window – control menus and runtime – create shortest keys for pop up menus – common dialogue control. | (6 Hrs) |
| 5. | Display date, time, string type conversion and Printing Information
Data reports and environments – display tabular data in report form– fundamentals of printing – printing with print form method. | (6 Hrs) |
| 6. | Data Base Programming
Connecting with database, using DAO, RDO and ADO | (6 Hrs) |
| 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 Petroustos 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

5.3 INTERNET PROGRAMMING USING JAVA

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RATIONALE

Today, the most likely place you will find Java is on World Wide Web. The web acts as convenient transport mechanism for Java programs and the web's ubiquity has popularized Java as an Internet development tool. Java has shifted the programming paradigm of single machine to distributed network of machines. Any application on World Wide Web can be easily implemented. Internet can have numerous applications and various protocols. This course will enable the students to learn in detail network programming language Java.

DETAILED CONTENTS

1. Introduction to Java (8 hrs)
A brief history, How Java Works. Java Virtual Machine (JVM), Java in time compiler (JIT), Java features, using Java with other Tools, Native code, Java Application types, compression with C+ and C++
2. Working with Data types, Control flow statements, Arrays, Costing, command line arguments (8 hrs)
3. Java Classes and Memory Management
Introduction to Classes, inheritance, encapsulation and Polymorphism, constructors and Finalizers, Garbage collection, Access specifier
4. Interfaces and Packages (6 hrs)
Using Java interface, using Java Packages
5. Exception Handling and Stream Files (8 hrs)
Over view of exception handling, Method to use exception handling, Method available to exceptions (The throw statement, The throws class, Finally class), Creating your own exception classes
6. Threads and Multi-threading (6 hrs)
Overview, Thread Basics - Creating and running a thread, The thread control methods, The threads life cycle and synchronization
7. Introduction to Applet, Application and JDK (6 hrs)
Java Applets Vs Java Applications, Building Application with JDK, Building Applets with JDK, HTML for Java Applets, Managing input-output stream
8. Java Data Base Connectivity (JDBC) (6 hrs)

LIST OF PRACTICALS

1.
 - a) Write a program which tells whether a number is even or odd. Take a range from 1 – 50
 - b) Display the output which is given below:


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* *
* * *
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 - c) Write a program which sorts an array of type integer
 - d) Write a programme to determine the sum of the following harmonic series for a given value of n: $1 + 1/2 + 1/3 + \dots + 1/n$ the value of n should be given interactively through the keyboard
2. Write a programme to convert the given temperature in Fahrenheit to Celsius using the following conversion formula
 $C = F \cdot 32 / 1.8$ and display the value in a tabular form
3. Write a programme to find the number of and sum of all integers greater than 100 less than 200 that are divisible by 7
4. Given a list of marks of ranging from 0 to 100, write a programme to compute and print the number of student should have obtained marks (a) in the range 81 to 100 (ii) in the range 61 to 80 (c) in the range 41 to 60 (d) in the range 0 to 40. The programme should use a minimum number of if statement
5. Admission to a professional course is subject to the following conditions:
 - a) Marks in mathematics ≥ 60
 - b) Marks in physics ≥ 50
 - c) Marks in chemistry ≥ 40
 - d) Total in all 3 subjects ≥ 200 (OR)
 Total in mathematics and physics ≥ 150 given the marks in the 3 subjects. Write the programme to process the application to list the eligible candidates
6. The number in the sequence 1 1 2 3 5 8 13 21 are called fibonacci numbers. Write programme using a do while loop to calculate and print the first m fibonacci numbers (Hint: after the first 2 numbers in the series, each number is the sum of the 2 preceding the numbers)
7. Write a programme to evaluate the following investment equation $V = P(1+r)^n$ and print the tables which would give the value of v for various combination of the following values of P, r and n.

RECOMMENDED BOOKS

5. Mastering Java by John Zukowski; BPB Publication, New Delhi
6. The Complete Reference by Patrick Naughton, Tata McGraw Hills, New Delhi
7. Java Programming by Balagurusamy
8. Set of Books on Java by Sun Microsystems
9. Java 2 Programming Bible by Aaron Walsh, Justin Couch, Daniel Steinberg, IDG Books India Pvt. Ltd., Netaji Subhash Marg, Darya Ganj, New Delhi
10. Java 2 Swing, Servlets, JDBC and Java Beans Programming Black Book by Steven Holzner, IDG Books India Pvt. Ltd., New Delhi
11. Java Programming- "How to Program Java" by Dietel and Dietel
12. An Introduction to Java Programming by Y Daniel Liang; Prentice Hall of India
13. The Complete Reference Java by Herbel Schildt; McGraw Hills, New Delhi
14. Core Java by Cay S Horstmann and Gary Cornell.
15. Introduction to Cryptography with applets by David Bishop, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

Elective - I
5.4 (a) ORACLE
(Common with Computer Engineering)

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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)

6. Introduction to PL/SQL (6 hrs)

Advantages of PL/SQL, syntax of PL/SQL block, PL/SQL (character set, literals, 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 SUBQUERIES
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

5.5 SOFTWARE ENGINEERING (Common with Computer Engineering)

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RATIONALE

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

DETAILED CONTENTS

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| 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 Matrices Engineering | (6 hrs) |
| | Size, function, design, oriented matrices, 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

6.6 MINOR PROJECT WORK

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Minor project work aims at exposing the students to various developments taking place in the field of information technology. It is expected from them to get acquainted with field of IT / industrial environment at the work place 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 field organisations/ industries. Depending upon the interest of students they are sent for exposure to:

- 1) Handling different software and Surfing Internet
- 2) Web Page Designing
- 3) Desk top publishing (DTP) and use of latest software
- 4) Developing projects related to office automation
- 5) Management Information System
- 6) Field/Industrial practices in installation and maintenance of computers and computer networks
- 7) Commercial practices in respect of documentation and presentation
- 8) Software package development organisations
- 9) Developing a mini project using VB

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 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%