

5.1 COMPUTER PERIPHERALS AND INTERFACING

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RATIONALE

A computer engineer should be able to interface and maintain key-board, printer, mouse, monitor etc along with the computer system. The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system and pattern their respective operations. The student will be able to maintain keyboard, printer, monitors and Power Supplies (CVTs and UPSs) along with computer system. This subject provide the required background of computer installation, maintenance and testing of peripheral with micro computers So a course on Computer Peripherals and Interfacing Devices is required to develop such skills.

DETAILED CONTENTS

1. Video Display (06 hrs)
The basic principle of working of video monitors (CRT, LCD,LED), video display adapters, video modes, Video display EGA/VGA/SVGA/PCI/AGP adapters and their architecture, Overview of raster scan, vector graphic, their main difference and relative advantages, Concept of reduction and bandwidth of monitors refreshing of screen
2. Hardware Organization of PCs (08 hrs)
Types of motherboard and their details (Form Factor, Chipset), types of processors (INTEL, AMD) and their compatibility with motherboards, serial and parallel ports, PS/2, USB Ports, Interconnection between units, connectors and cables, RISC & CISC architecture, pipelining.
3. Storage Devices (08 hrs)
Memory Hierarchy, Types of Hard Disk Drives- EIDE, SATA, SCSI, SAS External Hard Disk. Constructional features and working of hard disk drive, optical (CD, DVD, Blue Ray) disk drive and Flash Drive, Logical structure of Hard Disk and its organization, boot record, Cache Memory, Virtual Memory.
4. Input and Output Devices (10 hrs)
Overview of input devices like keyboard, mouse, scanner. Overview of output devices like printer, impact and non-impact printer, principle and working of inkjet, dot matrix, line Printer and laser printers (Monochrome and Colour), plotter (Piezoelectric and Thermal), and modems. Software drivers for various output devices and their role.
5. Power Supplies (05 Hrs)
Working of SMPS, On-Line/Off-Line/Line-Interactive/uninterrupted power supplies (UPS), basic principle of working their importance and maintenance

6. Basic Input/Output System (05 hrs)
 Concept of BIOS. Function of BIOS, software interrupts, testing and initialization, configuring the system
7. Other Technologies (06 hrs)
 Mobile, digital camera, web camera, smart card, cost performance analysis while procuring the computer

LIST OF PRACTICALS

- 1) To study the working of CRT, LCD, LED (coloured and black and white monitor) and its troubleshooting .
- 2) To Study the components and internal parts, working of hard disk and CDROM, DVD, Flash Drives
- 3) To study the operations and components and internal parts of Key Board, mouse and their troubleshooting
- 4) Study of components and internal parts and working of DMP, Inkjet printer and Laser printer and various installation of printers
- 5) To study the SMPS circuit and measure its various voltages. Connecting SMPS to motherboard and other devices.
- 6) Study the operation and maintenance of UPS.
- 7) Exercise on assembling a PC with peripherals and testing the same.
- 8) Setup and configuration of ROM BIOS
- 9) Visit to nearby industry

INSTRUCTIONAL STRATEGY

While teaching the subject the teacher may take the interfacing devices like disk drives, printers, key-boards, scanners, plotters etc. physically and explain its working. Additional practical exercise on maintenance and repair on peripheral devices will help the students to develop adequate skills.

RECOMMENDED BOOKS

1. Hardware Trouble Shooting and Maintenance by B. Govinda Rajalu, IBM PC and Clones, Tata McGraw Hill 1991
2. The waite group writing MS DOS Device, Drives by Robert, S Lai: Addison, Wesley Publishing Co. 2nd Ed. 1992.
3. Hardware and Software of Personal Computers by SK Bose; Wiley Eastern Limited, New Delhi.
4. Microprocessors and Interfacing by Hall, Douglas: McGraw Hill
5. Microprocessors and Interfacing by Uffenbeck.
6. Fundamentals of Computers by Sukhvir Singh; Khanna Publishers, New Delhi

7. Computer Peripherals for Micro Computers, Microprocessor and PC by Levis Hahensteu
8. Inside the PC (Eight Edition) by Peter Norton; Tech Media Publication, New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (hrs)	Marks Allotted (%)
1.	Video Display	6	12
2.	Hardware Organisation of PCs	8	16
3.	Storage Devices	8	16
4.	Input and Output Devices	10	24
5.	Power Supplies	5	10
6.	Basic Input/Output System	5	10
7.	Other Technologies	6	12
Total		48	100

5.2 JAVA PROGRAMMING

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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 (JIT) compiler, Java features, using Java with other tools, native code, Java application types, comparison with C and C++
2. Working with data types, control flow statements, arrays, casting, command line arguments (10 hrs)
3. Java Classes and Memory Management (8 hrs)
Introduction to Classes, inheritance, encapsulation and polymorphism, constructors and finalizers, garbage collection, access specifier
4. Interfaces and Packages (8 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 (8 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 (8 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
 $C = F.32/1.8$ and display the value in a tabular form
- 3 Write a programme to find all the numbers and sum of all integers greater than 100 less than 200 that are divisible by 7
4. Given a list of marks 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:
 - Marks in mathematics ≥ 60
 - Marks in physics ≥ 50
 - Marks in chemistry ≥ 40
 - 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.

8. Write a program which will store the students roll no. names and total marks in the database
9. Write a program which will display all those records whose marks are above 75%
10. Write a programme to draw the following using Applet:



11. Exercises on implementing Java Classes.
12. Exercises on exceptional handling
13. Exercises on creating and running threads
14. Exercises on database Connectivity

INSTRUCTIONAL STRATEGY

The subject deals with object oriented concept. As the subject has both theory and practicals, more stress should be given to practical work.

RECOMMENDED BOOKS

1. The Complete Reference Java by Herbel Schildt; McGraw Hill, New Delhi
2. Java Programming by Balagurusamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Computer Programming in Java, W C/D by Junaid Khateeb, Wiley-India Pvt Ltd. Daryaganj, New Delhi
4. The Complete Reference by Patrick Naughton, Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Set of Books on Java by Sun Microsystems
6. Java 2 Programming Bible by Aaron Walsh, Justin Couch, Daniel Steinberg, IDG Books India Pvt. Ltd., Netaji Subhash Marg, Darya Ganj, New Delhi
7. Java Pogramming- "How to Program Java" by Dietal and Dietel
8. An Introduction to Java Programming by Y Daniel Liang; Prentice Hall of India
9. Core Java by Cay S Horseman and Lray Carnell.

10. Introduction to Cryptography with applets by David Bishop, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction to Java	8	10
2	Working with Data types	10	10
3	Java Classes and Memory Management	8	10
4	Interfaces and Packages	8	10
5	Exception Handling and Stream Files	8	30
6	Threads and Multi-threading	8	10
7	Introduction to Applet, Application and JDK	8	10
8	Java Data Base Connectivity (JDBC)	6	10
Total		64	100

5.3 INTERNET AND WEB TECHNOLOGIES

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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.

DETAILED CONTENTS

1. Internet Basics (08 hrs)

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, E-mail, Telnet, FTP, IRC, NNTP, Video conferencing, e-commerce
2. Internet Connectivity (04 hrs)

Telephone line, cable, leased line, ISDN, VSAT, RF link
3. World Wide Web (WWW): (08 hrs)

World Wide Web and its evolution, web page, web server, HTTP protocol. Examples of web servers. Navigation Tools: Mozilla Firefox, Google Chrome, Internet Explorer, Uniform Resource Locator (URL). Hypertext, hyperlinks and hypermedia, URL, its registration, browsers, search engines, proxy servers
4. Internet Security (04 hrs)

Basics of authentication and authorization. Introduction to firewall, various techniques of encryption and decryption, SSL (Secure Socket Layer)
5. Developing Portals Using HTML (16 hrs)

Introduction to HTML-5 and CSS-3 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. Client-side Scripting: Using Java Script, (08 hrs)

Java Script Event Modeling, Document Object Model (DOM), Validating Forms using Java script

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| 7. | Server-side Scripting:
PHP: GET POST Method, Control Structures | (08 hrs) |
| 8. | Dream weaver: Basic features of Dreamweaver | (08 hrs) |

LIST OF PRACTICALS

1. Configuring computer system to access internet
2. Managing social networking profile and e-mail account
3. Using WWW for accessing relevant information
4. To demonstrate the use of TELNET, FTP, IRC
5. Creating Web pages using HTML
6. Creating web pages using Dream Weaver
7. Demonstration of audio-video conferencing
8. Demonstration of e-commerce transaction
9. Validation of user queries and responses in the Forms using Java Script or VB script
10. Create a Homepage with frames, animation, background sound and hyperlinks
11. Develop hitometer for each client i.e. number of visitors. Visit to a site.
12. Designing simple server side program which accept some request from the client and respond
13. Establishing sessions between servers and clients
14. Design fill-out form with text, check box, radio buttons etc and embed Java script to validate users input.
15. Develop simple server side program in Server Script which accept some request from the client and respond.
16. Develop interface with database (MYSQL etc) for online retrieval and storage of data through PHP

INSTRUCTIONAL STRATEGY

Students should be exposed to Internet as the subject is practice oriented, theoretical Instruction may be given during practical session also.

RECOMMENDED BOOKS

1. Internet and Web Technologies by Rajkamal, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Internet 6-in-1 by Kraynak and Habraken, Prentice Hall of India Pvt. Ltd., New Delhi
3. Using the Internet IV edition by Kasser, Prentice Hall of India Pvt. Ltd., New Delhi
4. Using the World Wide Web, (IInd edition) by Wall, Prentice Hall of India Pvt. Ltd., New Delhi
5. A complete guide to Internet and Web Programming by Deven N. Shah, Wiley-India Pvt Ltd. Daryaganj, New Delhi
6. Internet for Everyone by Alexis Leon and Mathews Leon; Vikas Publishing House 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 Warrior 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
19. Web Technologies by Ivan Bayross.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1-4	24	40
5-6	24	40
7-8	16	20
Total	64	100

5.4 ADVANCED DATABASE MANAGEMENT SYSTEMS

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RATIONALE

The Course is aimed to provide the students an exposure of various database management operations and detail about the structured query language which supports different operations in a database. After completion of the course, the students will be able to design the user-friendly modules for different types of databases.

DETAILED CONTENTS

1. Introduction to Database System (6 hrs)
Review of Database System Concepts and Architecture, Data Models, Data Independence, SQL, Normalization.
2. Distributed Databases (6 hrs)
Distributed and parallel Database Concepts, Advantages and Disadvantages, Types of Distributed Database Systems, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design, Five Level Schema Architecture.
3. Object Oriented and Object Relational Databases (6 hrs)
Object Oriented Concepts, Object Oriented Data Model, Object Definition Language, Object Query Language, Object Relational Systems, SQL3, ORDBMS Design.
4. Basic Concepts and Installation of SQL Server (5 hrs)
Installing SQL server, starting and stopping an instance of database engine, SQL server management studio, using management studio with database engine, backup and recovery.
5. SQL Components and Data Definition Language (5 hrs)
SQL's basic objects, data types, aggregate functions, scalar functions, null values, creating database objects, modifying database objects, removing database objects.
6. Queries and Data Manipulation Language (5 hrs)
Insert statement, Update statement, Delete statement, Select statement, queries and sub-queries, different clauses of select statement, join operator, correlated sub-queries, derived tables.

7. Stored procedures and User defined functions (6 hrs)
Procedural extensions, IF statement, WHILE statement, local variables, try and catch statements, stored procedures, user defined functions, system catalog.
8. Indexes, Views and Security (5 hrs)
Guidelines for creating and using indexes, creating and using views, advantages and disadvantages of views, security system of database engine, database security, roles, authorization: grant, deny, revoke statements.
9. Triggers (4 hrs)
Introduction to triggers, creating and using triggers, database level triggers, server level triggers

LIST OF PRACTICALS

1. Installing and Uninstalling SQL Server.
2. Performing backup and recovery procedures using SQL Server.
3. Using and Understanding SQL server management studio.
4. Creating, modifying and removing database objects.
5. Working with queries involving joins, correlation, sub-queries, set operators.
6. Creating and using stored procedures and user defined functions.
7. Creating indexes
8. Creating and using views.
9. Using and understanding grant, revoke and deny statements
10. Creating and using database triggers.

RECOMMENDED BOOKS

1. Fundamentals of Database Systems by Ramez Elmasri, Shamkant Navathe; Pearson Education.
2. Data Base Management System By Ivan Byross
3. A Database System Concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan; Tata McGraw Hill.
4. Advanced Database Management Systems by Rini Chakrabarti Dasgupta, Wiley-India Pvt Ltd. Daryaganj, New Delhi

5. Database System Concepts: Design and Applications by S.K. Singh; Pearson Education.
6. Beginning Microsoft SQL Server 2008 Programming by Robert Vieira, Wrox.
7. Microsoft SQL Server 2008 Bible by Paul Nielsen, Uttam Parui; Wiley.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction to Database System	06	10
2	Distributed Databases	06	15
3	Object Oriented and Object Relational Databases	06	15
4	Basic Concepts and Installation of SQL Server	05	10
5	SQL Components and Data Definition Language	05	10
6	Queries and Data Manipulation Language	05	10
7	Stored procedures and User defined functions	06	15
8	Indexes, Views and Security	05	05
9	Triggers	04	05
	Total	48	100

5.5 ELECTIVE - I

5.5.1 OPEN SOURCE TECHNOLOGIES

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RATIOANLE

This course is aimed at providing the students with a fairly good knowledge and understanding of Open Source Software. After completion of this subject students will be able to use copyright free Open Source Software products in research and collaborate in enhancement of these OSS products.

DETAILED CONTENTS

1. Introduction (05 hrs)
Open Source Origins, Differences among Open Source, freeware, proprietary and other software. Principle and Techniques of Open Source Development, Issues in Open Source Software Development.
2. Legal Issues (04 hrs)
Copyright and IPR, Open Source Licenses, Open Standards
3. Open Source Operating Systems (12 hrs)
Linux's History and flavors, Installation of Libux: File system of linux, Network & packages Configuration, LILO, GRUB, Linux's fdisk. Overview of Linux structure, general purpose Linux commands; working with editor. Introduction to Open Office, Introduction to C/C++ programming in linux environment, shell programming.
4. Internet-The Technology (04 hrs)
Open standards, W3C Protocols, Role of XML in Open Source Software Development.
5. Open Source Database (07 hrs)
Introduction to MySQL, Database design and development using MySQL
6. Open Source Web Development Tools (10hrs)
PHP syntax (variables, control structures, functions), File Handling: Uploading files, Using PHP to open read, write and close external files and manipulate data. Security: Avoiding security pitfalls by careful coding.
7. Case studies related to successful implementation of open source software. (6 hrs)

LIST OF PRACTICALS

1. To install linux/Fedora/ ubuntu and understand its file system i.e. ext2, ext3.
2. To configure LINUX OS using LILO, Grub.

3. Introduction of LINUX shell-(Korn, Bourne, C Shell) and using shell commands.
4. To use XML and prepare database in XML.
5. To use MySQL and create tables in MySQL.
6. To prepare Web page using PHP.
7. To prepare Web forms using PHP and store database in MySQL.
8. To install, use open office and compare its features with MS Office.

RECOMMENDED BOOKS

1. Beginning PHP5, Apache, MySQL, Web Development by Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass; Wiley Publishing Inc.
2. Open Source SOA by Jeff Davis, Wiley-India Pvt Ltd. Daryaganj, New Delhi.
3. Unix for Programmers and Users by Graham Glass, King Ablas; Pearson Education

Internet sites:

1. www.opensource.org
2. www.w3.org

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	05	10
2	Legal Issues	04	10
3	Open Source Operating Systems	12	25
4	Internet-The Technology	04	10
5	Open Source Database	07	15
6	Open Source Web Development Tools	10	20
7	Case Studies related to successful implementation of open source software.	06	10
	Total	48	100

5.5 ELECTIVE - I

5.5.2 WIRELESS COMMUNICATION

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RATIONALE:

Wireless Communication course is intended to provide exposure and awareness of latest wireless communication technologies. This course is designed in conjunction with course "Computer Networks" which provide concepts of networks.

DETAILED CONTENTS

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| 1. | Introduction | (12 hrs) |
| | Evolution of Mobile Communication Systems, Paging systems, cordless telephone system, cellular telephone system, comparison of common wireless communication system, 2G cellular networks, 2.5G wireless network, HSCSD, GPRS, EDGE technology, 3G wireless network, UMTS, 3G CDMA2000, 3G TD-SCDMA, wireless local loop, blue tooth and personal area networks. | |
| 2. | System Design Fundamentals | (9 hrs) |
| | Frequency reuse, channel alignment strategies, handoff strategies, interference and system capacity, improving coverage and capacity in cellular systems, parameters for mobile multipath channel, small scale fading, | |
| 3. | Modulation Techniques | (10 hrs) |
| | Amplitude modulation, angle modulation, digital modulation, linear modulation techniques, constant envelope modulation, spread spectrum modulation techniques, equalization, equalizers in communication receiver, diversity techniques, RAKE receiver, fundamentals of channel coding. | |
| 4. | Multiple Access Techniques | (4 hrs) |
| | FDMA, TDMA, CDMA, SDMA | |
| 5. | Wireless Networking | (5 hrs) |
| | Different between wireless and fixed telephone networks, development of wireless networks, ISDN | |
| 6. | Wireless Systems | (8 hrs) |
| | GMS, GSM architecture, CDMA digital cellular standard, IS-95 system, IEEE 802.11b, 802.11G, blue tooth and RF | |

LIST OF PRACTICALS

1. Study the features, specification and working of cellular mobile
2. Signal strength measurement of various points from a transmitting antenna/cordless phone

3. Measurement of range for a cordless phone
4. Visit of a Mobile Switching Centre(MSC) in the nearest M.S. facility provider
5. Demonstration of Base Trans Receiver(BTS) with nearby cellular tower
6. Observing call processing of GSM trainer Kit.
7. Observing call processing of CDMA trainer Kit.
8. Practice of setting GPRS on Mobile phone
9. Repair of a (GSM) and a (CDMA) mobile phones
10. Measurement of cell boundary (time consuming project)
11. Data transfer using blue tooth

Demonstration
only

INSTRUCTIONAL STRATEGY

Explanation of concepts using realtime examples/case studies. . For the proper awareness of this subject it is must to provide the students the detail functioning of wireless/mobile system/equipment. Ffor this visits must be arranged to BTS/MSC (Mobile Switching Centre) providers. The theory classes need to be application based in addition to industrial visits in the BSNL, Vodafone, Airtel, SPICE , TATA indicom etc

RECOMMENDED BOOKS

1. Wireless Communications, Principles and Practice, by Theodore S.Rappaport.
2. Wireless Communications by Singal, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Wireless Communications by Misra, Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Introduction to Wireless and Mobile Systems, by Dharma Prakash Agarwal, Qing-An zeng.
5. Wireless Communications and Networking, by William Stallings.
6. Mobile and Personal Communication Systems and Services, by Raj Pandya, Prentice Hall of India, New Delhi
7. Mobile Communication by John Schiller, Prentice Hall of India, New Delhi
8. Wireless Communications by Pahalwan, Pearson Publishers
9. Wireless and Mobile Communication VK Sangar, Ishan Publications.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	12	25
2.	9	15
3.	10	25
4.	4	10
5.	5	10
6.	8	15
Total	48	100

5.5 ELECTIVE - I

5.5.3 SOFTWARE TESTING AND QUALITY ASSURANCE

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RATIONALE

The Course is aimed at teaching different techniques of testing a software after it is developed and to teach about various quality standards of a product. After completion of the course, the students will be able to design efficient test-cases for different software and compare it to the standard quality measures.

DETAILED CONTENTS

1. Introduction (07 hrs)
Review of Software Engineering, Software Process Models, Metrics, Importance of Software Testing and Quality Assurance.
2. Software Quality Assurance Concepts and Standards (07 hrs)
Definition of Quality, Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Inspections, Walkthroughs, Formal Technical Reviews, Review Guidelines, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126, CMM, TQM, TQM principles, Six Sigma, SPICE.
3. Risk Management and Configuration Management (06 hrs)
Types of Software Risks, Risks Identification, Risk Projection, Risk Refinement, The RMMM Plan, Software Configuration Management, Baselines, Software Configuration Items, SCM Process: Version Control, Change Control.
4. Software Testing (07 hrs)
Testing Fundamentals, Verification and Validation, Test Strategies for Conventional and Object Oriented Software, Unit Testing, Integration Testing, Validation Testing, Alpha and Beta Testing, Recovery Testing, Security Testing, Stress Testing, Performance Testing, Debugging Process, Debugging Strategies.
5. Testing Techniques (08 hrs)
Black Box and White Box Testing techniques, Flow Graph Notation, Basis Path Testing, Control Structure Testing, Equivalence Partitioning, Boundary Value Analysis, Object Oriented Testing Methods: Applicability of Conventional Test Case Design Methods, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, Interclass Test Case Design.

6. Testing Process (07 hrs)
 Test Plan Development, Requirement Phase, Design Phase and Program Phase Testing, Testing Tools, Features of test tools, guidelines for selecting a test tool, advantages and disadvantages of using testing tools, testing using automated tools.
7. Testing Specialized Systems (06 hrs)
 Testing Client/Server Systems, Testing Web based Systems, Testing Off-the-Shelf software.

LIST OF PRACTICALS

1. Study of open source quality assurance and software testing tools.
2. Use of software testing tools like CPPUnit, JUnit.
3. Use of configuration management tools like CVS, VSS.
4. Applying white box testing techniques to programs involving the use of control structures, pointers, arrays, structures, files etc.
5. Applying white box testing techniques to programs involving the use of object oriented concepts like encapsulation, abstraction, inheritance, polymorphism etc.
6. Applying black box testing techniques to programs involving the use of control structures, pointers, arrays, structures, files etc.
7. Applying black box testing techniques to programs involving the use of object oriented concepts like encapsulation, abstraction, inheritance, polymorphism etc.

RECOMMENDED BOOKS

1. Software Testing: Principles, Techniques and Tools by M.G. Limaye; Tata McGraw Hill
2. Software Engineering: A Practitioner's Approach by R.S. Pressman; Tata McGraw-Hill.
3. Effective Methods for Software Testing William E.Perry; John Wiley & Sons.
4. Software Engineering by Ian Sommerville; Pearson Education.
5. Software Engineering by K.K. Aggarwal, Yogesh Singh; New Age International.
6. Software Quality Assurance-Principles and Practice by Nina S Godbole; Narosa.
7. Software Testing Techniques by Boris Beizer, Dreamtech.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	07	10
2	Software Quality Assurance Concepts and Standards	07	15
3	Risk Management and Configuration Management	06	15
4	Software Testing	07	15
5	Testing Techniques	08	20
6	Testing Process	07	15
7	Testing Specialized Systems	06	10
	Total	48	100

5.5 ELECTIVE - I

5.5.4 DATA WAREHOUSING AND MINING

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RATIONALE

The Course is aimed to provide the students a brief knowledge of storing and retrieving data in a data warehouse in an efficient manner using different methodologies. After completion of the course, the students will be able to process the data and easily prepare the enterprise reports etc.

DETAILED CONTENTS

1. Introduction (06 hrs)
Introduction to RDBMS, Data Warehouse, Transactional Databases, Introduction to OLTP and OLAP
2. Data Warehouse (16 hrs)
Difference from traditional databases, Role of Data Warehousing Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs multi-dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, Data Warehouse architecture, ROLAP, MOLAP, HOLAP, Data Warehouse Implementation, Data Cube, Metadata Repositories, OLAM.
3. Data Processing (06 hrs)
Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept hierarchy generation.
4. Basics of Data Integration (Extraction Transformation Loading) (08 hrs)
Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.
5. Basics of Enterprise Reporting (04 hrs)
Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to Reporting Architecture.
6. Data Mining Architecture (08 hrs)
Data Mining Functionalities, Interestingness of pattern, classification of data mining system, major issues Data Mining primitives, Task relevant data, interestingness measures, presentation and visualization of patterns, Data Mining Architecture, Concept

Description, Data Generalization and Summarization, Attributed oriented induction, Analytical characterization, Mining class comparisons.

LIST OF PRACTICALS

1. To prepare multidimensional model for a given database problem.
2. To prepare concept hierarchy, star, snowflake model.
3. To use open source software such as Pentaho, Kettle for data integration.
4. To perform Data Transformation using Pentaho software.
5. To prepare data reports using Microsoft SQL server Reporting services.
6. To use Data Mining Software such as WEKA Rapid Mines or SPSS, Mathematica.

RECOMMENDED BOOKS:

1. Data Warehousing and Mining by Shinde, Wiley-India Pvt Ltd. Daryaganj, New Delhi
2. Data Mining: Concepts and Techniques by J.Han and M.Kamber By Morgan Kaufman publishers, Harcourt India pvt. Ltd. Latest Edition.
3. Data Mining Introductory and Advance Topics by Dunham, Pearson Education, Latest Edition.
4. Business intelligence for the enterprise by Mike Biere, Addison Wesley,

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	06	15
2	Data Warehouse	16	30
3	Data Processing	06	15
4	Basics of Data Integration (Extraction Transformation Loading)	08	15
5	Basics of Enterprise Reporting	04	10
6	Data Mining Architecture	08	15
	Total	48	100

5.6 MINOR PROJECT WORK

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Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with computer environment possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of two to four weeks at a stretch in different establishments. 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 organizations
- 6) Software package development organizations
- 7) Maintenance of database
- 8) Write be stored procedure or functions which can be attached as the library objects to the main projects
- 9) Write a procedure function to convert number of words.
- 10) Write a procedure function to convert all data function (create your own) Database connectivity, (SQL server, Oracle, Access), Library classes in C++ (same application)., use of graphics in C++, Encryption decryption program, Active-X controls in 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/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%

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills
2. Correspondence and job finding/applying/thanks and follow-up
3. Resume Writing
4. Interview Techniques: In-Person interviews; telephonic interviews, panel interviews; group interviews and video conferencing etc.
5. Presentation Techniques
6. Group Discussions Techniques
7. Aspects of Personality Development
8. Motivation
9. Leadership
10. Stress Management
11. Time Management
12. Interpersonal Relationship
13. Health and Hygiene