

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

POST GRADUATE DIPLOMA IN COMPUTER APPLICATION

Total Contact Hours = 27

Total Marks = 700

Total Credits = 22

| SEMESTER 1 st | | Contact Hrs | | | Marks | | | Credits |
|--------------------------|--|-------------|----------|-----------|------------|------------|------------|-----------|
| Subject Code | Subject Name | L | T | P | Int. | Ext. | Total | |
| PCAP1-101 | Information Technology and Office Automation | 3 | 1 | - | 40 | 60 | 100 | 4 |
| PCAP1 -102 | Programming in C | 3 | 1 | - | 40 | 60 | 100 | 4 |
| PCAP1 -103 | Computer Architecture and Organization | 3 | 1 | - | 40 | 60 | 100 | 4 |
| PCAP1-104 | Software Engineering | 3 | - | - | 40 | 60 | 100 | 3 |
| PCAP1-105 | Software Lab-I (Information Technology and Office Automation based on PCAP1-101) | - | - | 4 | 60 | 40 | 100 | 2 |
| PCAP1-106 | Software Lab-II (Programming in C based on PCAP1-102) | - | - | 4 | 60 | 40 | 100 | 2 |
| MHUM0-104 | Business Communication | 2 | - | 2 | 40 | 60 | 100 | 3 |
| Total | Theory = 5 Labs = 2 | 14 | 3 | 10 | 320 | 380 | 700 | 22 |

Total Contact Hours = 30

Total Marks = 700

Total Credits = 23

| SEMESTER 2 nd | | Contact Hrs | | | Marks | | | Credits |
|---|--|-------------|----------|-----------|------------|------------|------------|-----------|
| Subject Code | Subject Name | L | T | P | Int. | Ext. | Total | |
| PCAP1-207 | Database Management System | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| PCAP1-208 | Computer Networks | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| PCAP1-209 | Operating System | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| PCAP1-210 | Seminar | 0 | 0 | 6 | 40 | 60 | 100 | 3 |
| PCAP1-211 | Software Lab-III (Database Management System based on PCAP1-207) | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| Departmental Elective – I (Choose any one as per *) | | 3 | 1 | 0 | 40 | 60 | 100 | 4 |
| PCAP1-256 | Programming in Java | | | | | | | |
| PCAP1-257 | Programming in PHP | | | | | | | |
| PCAP1-258 | Programming in ASP.Net | | | | | | | |
| Departmental Elective – II (Choose any one as per *) | | 0 | 0 | 4 | 60 | 40 | 100 | 2 |
| PCAP1-259 | Software Lab-IV(Programming in Java based on PCAP1-256) | | | | | | | |
| PCAP1-260 | Software Lab-V (Programming in PHP based on PCAP1-257) | | | | | | | |
| PCAP1-261 | Software Lab-VI (Programming in ASP.Net based on PCAP1-258) | | | | | | | |
| Total | Theory = 4 Lab = 2 | 12 | 4 | 14 | 320 | 380 | 700 | 23 |

*Note: Students have to select a combination of subjects in Departmental Elective –I as below:

- i) PCAP1-256 and PCAP1-259
- ii) PCAP1-257 and PCAP1-260
- iii) PCAP1-258 and PCAP1-261

Overall

| Semester | Marks | Credits |
|-----------------|-------------|-----------|
| 1 st | 700 | 22 |
| 2 nd | 700 | 23 |
| Total | 1400 | 45 |

FUNDAMENTALS OF INFORMATION TECHNOLOGY & OFFICE AUTOMATION

Subject Code: PCAP1-101

L T P C
3 1 0 4

Duration: 46 Hrs

Learning Objectives

1. This course will enable the student to gain and understanding of the core concepts and technologies which constitute Information Technology.
2. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

UNIT-I (13 Hrs)

Historical Evolution of Computer - Block Diagram of computer, Characterization of computers, Types of computers, Computer Generations.

Basic Anatomy of Computers - Memory unit, Input-output unit, Arithmetic logic unit, Control unit, Central processing unit, RAM, ROM, PROM, EPROM.

Input-Output Devices - Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Voice Recognition Devices, Optical Recognition devices, Dot matrix, Character and Line printer, Desk Jet printer, Laser printer and Plotters.

UNIT-II (9 Hrs)

Number System - Non-positional and Positional number systems, Base conversion, Binary, Decimal, Hexadecimal and Octal systems, Conversion from one system to the other.

Binary Arithmetic - Addition, Subtraction and Multiplication

Computer Codes - Weighted and Non-weighted code, BCD, EBCDIC, ASCII, Unicode, XS-3, Grey Codes

UNIT-III (13 Hrs)

Computer Software - Introduction, Types of software.

Personal Productivity Software - Word processing: Editing features, formatting features, Saving, Printing, Table handling, Page settings, Spell-checking, Macros, Mail-merge and Equation editors.

Spreadsheet - Workbook, Worksheets, Data Types, Operators, Cell Formats, Freeze Panes, Editing Features, Formatting Features, Creating Formulas, Using Formulas, Cell References.

Presentation Graphics Software - Templates, Views, Formatting Slide, Slides with Graphs, Animation, Using Special Features, Presenting Slide Shows

UNIT- IV (11 Hrs)

Computer Network and Communication - Network types, Network topologies, Network communication devices.

Internet and its Applications - E-mail, TELNET, FTP, World Wide Web, Internet chatting, Intranet, Extranet, Gopher, Mosaic, WAIS.

Security management Tools - PC tools, Norton Utilities, Virus, Worms, Threats, Virus Detection, Prevention and Cure Utilities, Firewalls, Proxy Servers.

Recommended Books

1. V. Rajaraman, 'Fundamental of Computers', 3rd Edn., PHI.
2. Satish Jain, 'Information Technology Concepts', 4th Edn., BPB Publications.
3. P.K. Sinha, 'Foundations of Computing', 1ST Edn., BPB.
4. Turban, Mclean and Wetherbe, 'Information Technology for Management' , 2nd Edition", John Wiley & Sons.
5. Courter G, 'Mastering MS Office 2000 Professional', 2nd Edn., BPB Publication.
6. Steve Sagman, 'MS- Office 2000 for Windows', 1st Edn., Addison Wesley.

Learning Outcomes

After completion of this course, the students would be able to:

1. Identify and understand the working of key components of a computer system and representation of numbers, alphabets and other characters.
2. Identify and understand the working of different operating systems and to install windows.
3. Become proficient in using the features of word processing in Word processing.
4. Students will be able to create technical and complex spreadsheets for data analysis using spreadsheet tools.
5. Students will become proficient to develop effective and professional business presentations using Power Point tools.
6. The students will learn about types of Communication networks, use of internet applications and security within the context of Information Technology.

PROGRAMMING IN C

Subject Code: PCAP1-102

L T P C
3 1 0 4

Duration: 45 Hrs.

Learning Objectives

1. The objective of this course is to help the students in finding solutions to various real life problems and converting the solutions into computer program using C language (structured programming).
2. Students will learn to write algorithm for solutions to various real life problems and converting the algorithms into computer programs using C language.

UNIT-I (11 Hrs)

Programming Process - Problem definition, Algorithms, Flow Charts, C Character set, Identifiers and Keywords, Constant and Variables, Data types, Declarations, Statements and Symbolic Constants.

Operators and Expressions - Arithmetic, Relational, Logical, Unary operators.

Bitwise Operators - AND, OR, Complement precedence and Associating bitwise shift operators

Input-Output - Standard, Console and String functions.

Coding Standards - Inline documentation, Indentation of Code.

Naming Conventions - Variables, Global Variables, Functions, Structures.

Debugging - Tracking defects, Debugging by Code Inspection, Debugging by logs, Debugging using step-by-step execution, using break points.

UNIT-II (13 hrs)

Control Statements - Branching, Looping using for, While and Do-while Statements, Nested control structures, Switch, Break, Continue statements.

Arrays - Definition, Access of Elements, Initialization, Multidimensional arrays, Character arrays.

Pointers - Address and Dereferencing operators, Declaration, Assignment, Initialization, Arithmetic, Precedence of Address and Dereferencing Operators, Pointer Comparison, Conversion, Pointer arrays and Pointers to Pointers. Pointers and Strings, Void pointers, Dynamic Memory Management

UNIT-III (10 Hrs)

Functions - Definition, Call, Prototypes, Formal and Actual parameters, passing arguments to functions, call by value and Call by address, passing array elements as arguments and Passing arrays as arguments, Recursion, Recursion v/s Iteration.

Program Structure - Storage classes, Automatic, External and Static variables.

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

Pre-processor Directives - #include, #define, #undef, #if, #ifdef, #ifndef, #else, #elif, #endif, #error, #pragma, Predefine macros.

UNIT-IV (11 Hrs)

Structure - Variable, Initialization, accessing members, Assignment, Size of structure, Scope of a structure, Nested structures, Pointer to structures, Scope of a structure, Type definition, Structure as function arguments, Arrays of structures, Structures containing arrays, Self-referential structures, Bit fields, Union, Enumerated data type.

File Processing - Opening and Closing, Data files, Creation, Processing & Unformatted data files, Random file access, Command line arguments.

Recommended Books

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.
2. E. Balagurusamy, 'Programming in ANSI C', 2nd Edn., Tata McGraw Hill.
3. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI.
4. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
5. ISRD Group, 'Programming and Problem Solving Using C, 3rd Edn., Tata McGraw Hill.
6. Yashvart P. Kanetkar, 'Let us C', 2nd Edn., BPB Publications, New Delhi.

Learning Outcomes

After completion of this course, the students would be able to:

1. Understand the basic terminology used in computer programming. Students will be able to write, compile and debug programs in C language and use different data types in a computer program.
2. Design programs involving decision structures, loops, breaking control statements.
3. Design programs using arrays and understand the dynamics of memory by the use of pointers.
4. Design programs involving functions and learn to understand and analyze the use of storage classes and pre-processor directives.
5. Provide students with the means of writing efficient code using structures and learn file handling.

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code: PCAP1-103

L T P C
3 1 0 4

Duration: 45 Hrs.

Learning Objectives

1. To make students aware about the basic building blocks of computer system and how the different components are interfaced together.
2. Students will come to know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system.

UNIT-I (15 Hrs)

Boolean Algebra - Boolean operations, Truth Tables, Boolean Laws, K-maps (2, 3 and 4 variable maps, don't care conditions).

Basic Gates, Combinational Logic Design - Half-adder, Full adder, Parallel adder.

Sequential Circuits - Concept, Flip-flops (D, RS, JK, T), Counters (Ripple, Asynchronous, Synchronous)

UNIT-II (9 Hrs)

Basic Computer Organization and Design - Common Bus System, Registers, Instruction codes, Computer Instructions, Timing and Control, Instruction Cycle, Arithmetic, Logic &

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

Shift micro operations instructions, Memory Reference Instructions, Design of Basic Computer and it's working, Addressing modes.

UNIT-III (9 Hrs)

Programming & Controlling Basic Computer - Machine & Assembly Language, Programming Arithmetic and Logic Operations, Hardwired & Micro programmed control, Address Sequencing, Design of a control unit, Features of RISC and CISC.

UNIT- IV (12 Hrs)

Memory Organization - Main Memory-Memory Address Map, Memory connection to CPU, Associative Memory-Hardware organization, Cache Memory-Levels of Cache, Associative Mapping, Direct Mapping, Set-Associative Mapping, Virtual Memory.

I/O organization - I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA., Block diagram depicting architecture of 8085 machine.

Recommended Books

1. M. Morris Mano, 'Computer System Architecture', 3rd Edn., PHI.
2. William Stallings, 'Computer Organization and Architecture', Pearson.
3. P.V.S. Rao, 'Computer System Architecture', 2nd Edn., PHI.
4. J.P. Hayes, 'Computer Architecture & Organization, 3rd Edn., McGraw Hill.
5. Stone, 'Introduction to Computer Architecture', 3rd Edn., Galgotia.
6. Tanenbaum, 'Structured Computer Organization', 3rd Edn., PHI.

Learning Outcomes

After Completion of the course students will be able to

1. Acquired knowledge about basic logic gates and Boolean algebra.
2. Ability to Identify, Analyze and Design Combinational Circuits and Synchronous and Asynchronous Sequential Circuits.
3. Acquired Knowledge about Basic Computer Organization and Design.
4. Ability to Understand Programming & Controlling the Basic Computer System.
5. Acquired Knowledge about Memory Organization and I/O Organization.

SOFTWARE ENGINEERING

Subject Code: PCAP1-104

L T P C
3 1 0 4

Duration: 45Hrs.

Learning Objectives:

The objective of the course is to help the students to get conceptual knowledge required for various methods. Model used under software development process as well as new techniques.

UNIT-I (9 Hrs)

Software Engineering - Evolution of Software Engineering, Goals of software engineering, Software Development vs. Software Engineering.

Software Process - Software Process, Waterfall, Spiral, Prototyping, Selection of appropriate process model Fourth Generation Techniques, Role of Metrics & Measurements.

UNIT-II (11 Hrs)

S/W Project Planning - Objectives of Software Project Planning. Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation.

Cost Estimation Models - COCOMO Model, the S/W Equation.

Software Requirements Analysis - Analysis Principles, SRS, Components of SRS, Requirement Elicitation Techniques- FAST and QFD

UNIT-III (11 Hrs)

Software Design - Design Objectives, Principles, Design Concepts, Design Process

Design Methodologies - Data Design, Architectural Design, and Procedural Design, Object oriented design, User- interface design.

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

Principles of structured Analysis and Design Tools - DFD, DD, Decision Tables and Decision Trees.

UNIT-IV (14 Hrs)

Software Testing - Testing Fundamentals- Error/Fault/Failure, Testing Principles, Test Cases
Testing Techniques - White Box, Black-Box Testing & its Technique: Equivalence Class Partitioning, Boundary Value Analysis, White-Box Testing & its Techniques: Basis Path Testing, Structural Testing, Logic Based Testing, Fault Based Testing.

Software Testing Strategies - Unit Testing, Integration Testing, System Testing, Verification and Validation Testing, Acceptance Testing, Alpha and Beta Testing, Regression Testing.

Recommended Books

1. R.S. Pressman, 'Software Engineering: A Practitioner's Approach', 3rd Edn., McGraw Hill.
2. P. Jalote, 'An Integrated Approach to Software Engineering', 3rd Edn., Narosa Publishing House.
3. Rajib Mall, 'Fundamentals of Software Engineering', 2nd Edn., PHI.
4. Deutsch, Willis, 'Software Quality Engineering: A Total Technical and Management Approach', 2nd Edn., Prentice Hall.
5. T.G. Lewis, 'Software Engineering', 2nd Edn., McGraw Hill.
6. Shere, Kenneth, 'Software Engineering & Management', 2nd Edn., Prentice Hall.

Learning Outcomes

1. Understand the Process to be followed in SDLC.
2. Knowledge about Project Planning and Cost Estimation Models.
3. Define Formulate and Analyse a Problem.
4. Ability to Understand Software Design in Detail.
5. Apply Testing Principles to Software Project Development.

SOFTWARE LAB – I

(INFORMATION TECHNOLOGY & OFFICE AUTOMATION BASED ON PCAP1-101)

Subject Code: PCAP1-105

L T P C

Duration: 60 Hrs.

0 0 4 2

Learning Objectives

1. This course will enable the student to gain and understanding of the core concepts and technologies which constitute Information Technology.
2. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

Windows Operating System - Installing WINDOWS with set-up, Starting and Quitting WINDOWS, Basic Elements of WINDOWS, working with menus dialogue boxes, Window Applications, Windows Explorer, My Computer, Recycle bin, Programs, Favourites, My Documents.

Settings- Control Panel, Printers, Taskbar and Start menu, Folder Options, Active Desktop, Find, Help, Run.

Accessories – Entertainment, Games, System tools, Internet Tools, Calculator, Calendar, Clock, Card file, Note pad, Write pad, Recorder etc.

Word Processing & Presentation Tool - Salient Features of Word, Installation of Word, Starting and Quitting of Word, File, Edit, View, Insert, Format, Tools, Tables, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Word Processors and Software Packages.

Salient Features of Power Point, Installation, Starting and Quitting, File, Edit, View, Insert, Format, Tools, Slide Show, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Presentation Tool and Software Packages.

Spreadsheet Tool - Spread Sheet, getting started with Excel worksheet, entering data into Work Sheet, editing cell addressing, Ranges and range names, Commands, Menus, Copying and Moving cell contents, Inserting and Deleting rows and columns, Column width control, Cell protection, Printing reports, Creating and Displaying Graphs, Statistical functions.

Learning Outcomes

After completion of this course, the students would be able to:

1. Familiarize with PC and WINDOWS commands, File creation, Editing, Directory creation.
2. Become proficient in using the features of word processing in Word.
3. Become proficient in using spreadsheet software and be able to create technical and complex spreadsheets for data analysis using spreadsheet tools.
4. Understand the use of Internet and its applications

SOFTWARE LAB – II
(PROGRAMMING IN C - BASED ON PCAP1-102)

Subject Code: PCAP1-106

L T P C

0 0 4 2

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Implement the following Concepts in C Programming:

1. **Decision Making:** switch, if-else, nested if, else-if ladder, break, continue, goto
2. **Loops:** while, do-while, for statements.
3. **Functions:** Definition, Declaration, variable scope, parameterized functions, return statement, call by value, Call by reference, recursive functions.
4. **Pre-processor Directives:** Pre-processor directives like INCLUDE, IFDEF, DEFINE etc.
5. **Header Files:** STDIO.H, MATH.H, STRING.H, PROCESS.H etc
6. **Arrays:** Array declarations, Single and multi-dimensional, memory limits, strings and string functions
7. **Pointers:** Pointer declarations, pointer to function, pointer to array/string
8. **Files:** Creation and editing of various types of files, closing a file (using functions and without functions)

Learning Outcomes

After completion of this course, the students would be able to:

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, linking and executing a program using the development environment.
3. Analyzing the complexity of problems, modularize the problems into small modules and then convert them into programs
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user-manuals.

BUSINESS COMMUNICATIONS

Subject Code: MHUM0-104

L T P C
2 0 2 3

Duration: 28 Hrs

Learning Objectives: This course is designed to give students a comprehensive view of communication, its scope and importance in business, the role of communication in establishing a favourable image of the organization. The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations. This course will make student conversant with fundamentals of communication, help them honing oral, written and non-verbal communication skills and to transform their communication abilities.

UNIT- I (7 Hrs)

Introduction to Communication: Meaning, Process, Importance of Communication in Business, Types of Information, Formal and Informal Communication, Internal and External Communication. Approaches to Effective Communication, Essentials of Effective Business Communication (7Cs model)

Written Communication: Advantages and Disadvantages, Covering letter, Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments

UNIT –II (7 Hrs)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Learning How to Think and Read, Developing Effective Reading Habits, Reading Tactics and Strategies: Training Eye and Training Mind (SQ3R)

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening

UNIT- III (7 Hrs)

Oral Communication: Advantages and Disadvantages, Conversation as Communication, Art of Public Speaking, Group Communication Through Committees, Preparing and Holding Meetings, Overcoming Stage Fright, Ambiguity Avoidance.

Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion Letters, Resignation Letters, Newsletters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release

Report Writing: Structure, Types, Formats, Drafting of Various Types of Report. Nonverbal – Features, Understanding of Body Language, Posture, Gestures. Influences on Communication: Social Influences, Culture and Communication, Few Guidelines for Better Multicultural Communication, Business Etiquettes and Communication.

UNIT- IV (7 Hrs)

Group Discussion: Nature, Uses and Importance, Guidelines for GD Presentations: How to Make Effective Presentations, Four P^s of Presentation, Structuring, Rehearsing and Delivery Methods.

Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume. Interviews: Preparation Techniques, Frequently Asked Questions about How to Face an Interview Board, Proper Body Posture, projecting a Positive Image, Steps to Succeed In Interviews, Practice Mock Interview in Classrooms.

The Case Method of Learning: Dimensions of a Case, Case Discussion, Usefulness of The Case Method, Training of Managers, Use The Case Method. Report Writing: Structure, Types, Formats, Preparations and Presentation.

Course Outcomes: After studying this course the students will enable to:

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

- Know the dynamics of communication in the business world
- Practice the different tools of communication
- Enable them to speak effectively suited to the situation
- Improve their competence in English

Recommended Books

1. Lesikar, Petit & Flatly, 'Lesikar's Basic Business Communication', Tata McGraw Hill.
2. Raman Meenakshi, 'Prakash Singh, Business Communication', Oxford University Press.
3. Rizvi Ashraf, 'Effective Technical Communication', Tata McGraw Hill.
4. Krizan, Buddy, 'Merrier, Effective Business Communication', Cengage Learning.
5. Diwan & Aggarwal, 'Business Communication', Excel.
6. Baugh, Frayer & Thomas, 'How to Write First Class Business Correspondence', Viva Book.
7. Taylor, 'English Conversion Practice', Tata McGraw Hill.
8. Devaraj, 'Executive Communication', Tata McGraw Hill.
9. Ober, 'Effective Bossiness Communication', Cengage Learning.

DATABASE MANAGEMENT SYSTEM

Subject Code: PCAP1-207

L T P C
3 1 0 4

Duration: 45 Hrs.

Learning Objectives

The objective of this course is to help the students to get knowledge about databases its architecture various models.

UNIT-I (11 Hrs)

Traditional File Processing System - Characteristics, Limitations, Database: Definition, Composition.

Database Management System - Definition, Characteristics, Advantages over Traditional File Processing System, User of Database, DBA and its responsibilities, Database schema, Instance. DBMS architecture, Data independence, Three level Architecture of Database System: External Level, Conceptual Level and the internal level.

Database Languages - DDL, DML, DCL. Database utilities, Data Models, Keys: Super, Candidate, Primary, Unique and Foreign.

UNIT- II (11 Hrs)

Introduction to Data Models - Entity Relationship Model, Hierarchical, Network and Relational Model, Comparison of Network, Hierarchical and Relational Model

Entity Relationship Model - Concepts, Mapping cardinalities, Entity Relationship Diagram, Weak Entity Sets, Strong Entity Set, Aggregation, Generalization, Converting ER Diagrams to Table

Relational Data Model - Concepts, Constraints, Relational Algebra: Basic Operations, Additional Operations.

UNIT-III (14 Hrs)

Database Design - Functional Dependency, Decomposition, Problems Arising Out of Bad Database Design, Normalization, Multi-Valued Dependency, Database Design Process, Data Base Protection, Database Integrity.

Database Concurrency - Definition and Problems Arising Out of Concurrency

Database Security - Authentication, Authorization, Methods of Implementing Security.

UNIT- IV (9 Hrs)

MS-ACCESS - Introduction to MS-ACCESS, working with database and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering, Controls, Reports and Macro: creating reports, using Macros.

Recommended Books

1. C.J. Date, 'An Introduction to Data Base Systems', 3rd Edn., Narosa Publishers.
2. B.P. Desai, 'Database Management System', 3rd Edn., BPB Publications, New Delhi.
3. Henry F. Korth, S. Sudarshan, 'Database System Concepts', 3rd Edn., McGraw Hill.
4. Ramez Elmasri, Shamkant Navathe, 'Fundamentals of Database Systems', 5th Edn., Pearson.
5. Jeffrey D. Ullman, 'Principles of Database Systems', 2nd Edn., Galgotia Pub.
6. D. Kroenke., 'Database Processing', 2nd Edn., Galgotia Publications.
7. Naveen Prakash, 'Introduction to Database Management', 3rd Edn., TMH.
8. Joan Lambert, Joyce Cox, 'Microsoft Access 2013 Step by Step', 1st Edn., Kindle Publications.

Learning Outcomes

1. Describe fundamental elements of DBMS and database languages.
2. Explain the basic concepts of data models and relational database design.
3. Design E-R diagram to represent simple database applications scenarios.
4. Describe the concepts of Relational algebra and database language SQL.
5. Describe the concepts of design, concurrency and security.
6. The students will be able to use MS-ACCESS.

OPERATING SYSTEM

Subject Code: PCAP1-208

L T P C
3 1 0 4

Duration: 45 Hrs.

Learning Objectives

The objective of this course is to help the students to get detailed Knowledge of the various functions which are being performed by the operating system.

UNIT-I (13 Hrs)

Introduction to operating System - Operating system services, Introduction to various types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi-tasking operating system, Distributed operating system, Network operating system, Real time operating system, Multi-processor system.

Process Management - Process concept, types of Process scheduling, Basic concept of CPU Scheduling, Scheduling criteria, and Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms, Deadlock definition and its characterization.

UNIT-II (11 Hrs)

Memory Management - Single Absolute Partition, Single reloadable partition, Multiprogramming and Multiple Partitions (Multiple Fixed Partitions, Multiple Variable Partitions (Partition Selection Algorithms), Paging, Segmentation

Virtual Memory - Demand Paging (Locality of Reference, Page Locking, Page Size, Page Replacement Algorithms, Algorithm Performance, Allocation Policies, Working Set).

UNIT- III (11 Hrs)

File System Management - Directories and Names (Partitions, Per-Process Root Directory, Directory Structure, and Directory Entries), Types of File System Objects, File System Functions, Information Types, File System Architecture (Access Methods, Access Control, File Locking, Blocking, Allocation, Free Space).

UNIT- IV (10 Hrs)

Device Management - Hardware I/O Organization (I/O Control, Port and Memory-Mapped I/O, Module Registers, Busy Wait I/O, Polled I/O, Interrupt I/O, Direct Memory Access (DMA)), Software Organization (Network I/O, Logical I/O, Buffering, Caching, Device Drivers), Devices (Graphics, Text-Based Displays, Storage Disks, Hard-Disk Performance, Hard-Disk Scheduling, Formatting, Raid, RAM Disks).

Recommended Books

1. Peter bears Galvin, 'Operating System Principle', 7th Edn., Wiley.
2. I.A Dhotre, 'Operating Systems', 3rd Edn., Technical Publications.
3. Madnick and Donovan, 'Operating System', 4th Edn., McGraw Hill.
4. P.B. Henson, 'Operating System Principles', 3rd Edn., Prentice Hall.
5. P.B. Henson, 'Architecture of Concurrent Programs', 4th Edn., Prentice Hall.
6. J.L. Peterson, A. Silberchatz, 'Operating System Concepts', 3rd Edn., Addison Wesley.
7. A.S. Tenenbaum, 'Operating System: Design and Implementation', 5th Edn., PHI.

COMPUTER NETWORKS

Subject Code: PCAP1-209

L T P C
3 1 0 4

Duration: 45 Hrs.

Learning Objectives

The objective of the course is to help the students to get conceptual knowledge of all the networking basics along with various techniques used for communication between networks.

UNIT-I (11 Hrs)

Computer Networks - Introduction, Applications, Network hardware and Software (protocol hierarchies, Design Issues for Layers, Interfaces and Services: Connection Oriented and connection less), Network Structure and Architecture - Point to Point, Multicast, Broadcast, Classification of Networks-LAN, MAN and WAN. Reference Models - the OSI Reference Model.

Physical Layers - Circuit Switching, Packet Switching, Message Switching, Terminal Handling, Telephone System, Modems, Connections, Transmission Media

UNIT-II (12 Hrs)

Internet - Introduction, Relays, Repeaters, Bridges, Routers, Gateways

Internetworking - How Networks Differ, Concatenated Virtual Circuits, Connectionless Internetworking, Tunnelling, Internetwork Routing, fragmentation, Firewalls, Internet Architecture.

Data Link Layer - Design Issues, Elementary Data Link Protocols-Sliding Window Protocol, HDLC/SDLC, ALOHA, CSMA/CD, Token Passing, IEEE Standard 802 for LAN and WAN

UNIT-III (12 Hrs)

Network Layer - Design Issues, Routing Algorithms: Shortest Path Routing, Flooding, Distance Vector Routing, Flow Based Routing, Congestion Control Algorithms: Leaky Bucket, Token Bucket, Internet Working, The Network Layer In The Internet IP Protocol, IP Address.

Transport Layer - Design Issues, Elements of Transport Protocol, Addressing Establishing & Releasing a Connection, Flow Control & Buffering, TCP/IP Service Model, TCP Connection Management

UNIT- IV (10 Hrs)

Application Layer - The DNS Name Space, Electronic Mail, The World Wide Web, FTP: introduction, data transfer and distributed computation, Generalized File Transfer, The File Transfer Protocol.

MRSPTU PGDCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

Network Security - Introduction to Cryptography, Substitution Ciphers, Transposition Ciphers, One-Time Pads, Two Fundamental Cryptographic Principles

Recommended Books

1. Andrew S. Tanenbaum, 'Computer Networks', 4th Edn., PHI.
2. Behruoz A. Forouzan, 'Data Communications and Networking', 4th Edn., Tata McGraw Hill.
3. Douglas E. Comer, 'Internet Working with TCP/IP', Vol.1, 4th Edn., CPE.
4. Stallings, William, 'Data and Computer Communications', 8th Edn., PHI
5. Nance, Bary, 'Introduction to Networking', 4th Edn., PHI.
6. Larry L. Peterson, 'Computer Networks: A System Approach', 4th Edn., Elsevier Publication.

Learning Outcomes

1. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
2. Analyze the services and features of the Physical layer of OSI Reference model
3. Recognize the different internetworking devices and their functions and analyze the services and features of the data link layer of OSI Reference model.
4. Analyze the services and features of the data link layer of OSI Reference model.
5. Analyze the services and features of the Network layer of OSI Reference model.
6. Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.
7. Analyze the features and operations of various application layer protocols such as Http, DNS, and SMTP and network security.

SOFTWARE LAB-III

(DATABASE MANAGEMENT SYSTEM BASED ON PCAP1-207)

Subject Code: PCAP1-210

L T P C

0 0 4 2

Learning Objectives

The objective of this course is to help the students to get knowledge about databases and its Commands.

Implement the following SQL commands:

1. To create a table, alter and drop table.
2. To perform select, update, insert and delete operation in a table.
3. To make use of different clauses viz. where, group by, having, order by, union, intersection, set difference.
4. To study different constraints. [SQL FUNCTION]
5. To use oracle function viz. aggregate, numeric, conversion, string function.
6. To understand use and working with joins.
7. To understand use and working of sub-queries.
8. To make use of transaction control statement viz. rollback, commit and save point.
9. To make views of a table.
10. To make indexes of a table.
11. To inbuilt SQL function to create database. [PL/SQL]
12. Introduction to SQL & PL/SQL
13. To implement Cursor on a table.
14. To implement trigger on a table
15. Creating Procedures and Function.
16. To implement control structure.
17. To implement Packages.

Learning Outcomes

1. After the completion of this course:
2. Understand, appreciate and effectively explain the underlying concepts of database technologies.
3. Design & implement a database schema for given problem domain.
4. Populate & query a database using SQL DML/DDL commands.
5. Normalize a database.
6. Programming PL/SQL including stored procedures, stored functions, cursors, packages

MRSPTU