

FACULTY OF SCIENCE

SYLLABI

FOR

**COMPUTER APPLICATIONS
(ELECTIVE)**

(SEMESTER SYSTEM)

(1st to 6th Semester)

For

Examinations of 2017 – 2018

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PANJAB UNIVERSITY, CHANDIGARH.

Computer Applications (Elective) for B.A./B.Sc./B.Com. I, II, III (Examination 2017 - 18)

**SUMMARY CHART
COMPUTER APPLICATIONS**

Sr. No.	Paper	Name of Paper	Lectures per week	Max. Marks			Exam. Hours
				Ext.	Int.	Total	
First Semester							
1	CA01	Fundamentals of IT	6	30	5	35	3
2	CA02	Application Software	6	30	5	35	3
3	PCA01	Practical Based on CA01 and CA02	6	30	-	30	3
Second Semester							
4	CA03	C Programming Language	6	30	5	35	3
5	CA04	Operating System Concepts	6	30	5	35	3
6	PCA02	Practical Based on CA03	6	30	-	30	3
Third Semester							
7	CA05	Programming in C++	6	30	5	35	3
8	CA06	Web Designing	6	30	5	35	3
9	PCA03	Practical Based on CA05 and CA06	6	30	-	30	3
Fourth Semester							
10	CA07	Data Structure	6	30	5	35	3
11	CA08	Java Programming	6	30	5	35	3
12	PCA04	Practical Based on CA07 and CA08	6	30	-	30	3
Fifth Semester							
Programming with VB. NET and Oracle			6	65	10	75	3
Practical on Paper – A			6	-	-	25	3
Sixth Semester							
Fundamentals of Operating Systems			6	65	10	75	3
Minor Project – Based on VB.Net, Oracle & Linux			6	-	-	25	3

FIRST SEMESTER
Paper –CA01: Fundamentals of IT

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objectives: This course will enable students to get familiar with computer fundamentals and programming fundamentals.

Note :

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

Computer Appreciation: Introduction to computers, characteristics of computer; History of computers; Classification of computers on basis of size: (Micro, Mini, Mainframe and super computers), Working Principles, Generations; Applications of computers; Commonly used terms–Hardware, Software, Firmware; Basic Computer Organization: Block diagram of computer system- Input unit, Processing Unit and Output Unit; Description of Computer input devices: Keyboard, Mouse, Trackball, Light Pen, Touch screens, Scanner, Digital Camera; Output devices: Monitors, Printers, Plotters

Computer Memory: Representation of information: BIT, BYTE, Memory, Memory size; Units of measurement of storage; Main memory: Storage evaluation criteria, main memory organization, RAM and ROM and their types; Secondary storage devices: Sequential Access Memory, Direct Access Memory, Magnetic Tapes, Magnetic disks, Optical disks: CD, DVD; Memory storage devices: Flash Drive, Memory card

UNIT - II

Types of software: System, Utility and Application software; Programming Languages: Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison.

Introduction to Computer based Problem-solving: Steps of development developing of a program, Algorithm development, Flowchart, Pseudo codes, basic programming constructs, Documentation, Testing and Debugging

UNIT - III

Understanding Number System: Computer arithmetic; Number systems: Decimal, Binary, Octal, Hexadecimal, Conversions between different number systems

Character Codes: Introduction, need, ASCII, EBCDIC and Unicode character sets

UNIT - IV

Understanding Operating System using DOS: Introduction to operating systems and its functions, DOS and versions of DOS, Booting sequence; Warm and Cold Boot; Concepts of files and directories, Wildcard characters, Types of DOS commands, Internal Commands: cls, copy con, type, ver, volume, prompt, path name, date, time, md, cd, rd, copy, Del; External Commands: doskey, format, unformat, xcopy, fdisk, attrib, chkdsk; Introduction to Config.Sys and Autoexec.Bat.

Windows Operating System: Anatomy of windows, Taskbar Settings, Managing folders and files using Windows Explorer, Searching Files and folders, Customizing Windows, Paint, WordPad, Notepad, Control Panel.

Suggested Reading :

Essential :

1. P.K. Sinha : Computer Fundamentals, BPB Publications, Latest reprint
2. Mathur Rajiv: DOS 6.2 Quick Reference, Galgotia.

Further Readings:

3. Basandra, S.K. : Computers Today, Galgotia.
4. Fundamentals of Computers, PHI, New Delhi
5. Cowart, Robert, Using Microsoft Windows 2000 Professional, Que Publishing

Paper –CA02: Application Software

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objectives: This course will enable students to get familiar with Application Software for Word processing, Spreadsheet, Presentation and Data Base Management.

Note :

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.
- v. **Examiner will set paper independent of specific Word processing, Spreadsheet, Presentation and Data Base Management software.**

UNIT - I

Word Processing: Opening, Creating, Saving, Printing and closing Documents, Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move), Finding and Replacing Text, Spell Check, Autocorrect; Auto text, Character formatting, Page formatting; Document Enhancement: Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Adjusting Margins and Hyphenating Documents; Mail Merge: Creating Master Document and Data Source, Merging and printing Documents; Inserting Pictures, Tables, Macros: create, execute and reusability feature

UNIT - II

Spreadsheets: Worksheet overview, Row, Column, Cells, Menus, Creating, Opening, Saving and printing worksheet; Auto fill, working with Formulae, Data formatting (number formatting, date formatting), Working with Ranges, Absolute, relative and Mixed addressing, creating, sorting and filtering Data Base; Charts: creating chart, adding Titles, Legends etc. to charts, Printing Charts; Macros: creating Macros, Recording Macros, Running Macros, Assigning shortcuts to Macros; Functions (Statistical, financial, Mathematical, string, date and time).

UNIT - III

Presentation Software: Creating, saving, and printing presentations; selecting design templates, Inserting tables and images, animations and transitions, Auto content Wizard, Changing Background

UNIT - IV

Databases: Introduction to database, Creating database using Wizard or from scratch, creating tables using wizard, entering data, using design view, saving, inserting, editing, Changing properties of fields, setting primary key.

Suggested Reading :

1. Mansfield Ron: MS Office, Tata McGraw Hill.
2. OOoAuthors Team : Getting Started with OpenOffice.org 3.3, Friends of OpenDocument
3. Singleton, Roderick G.: OpenOffice.org User Guide.

Paper – PCA01: Practical based on CA01 and CA02

Total Periods: 60
(6 Periods/week)

Max. Marks: 30
Exam Hours: 3

- Introduction to Autoexec.bat, Modifying config.sys, Important DOS commands
- Word Processing: Formatting, Spelling Checking, Mail-merging of documents, Macros
- Using worksheets/Database for Payroll, Inventory etc.
- Creating and managing Database
- Preparation of presentation on topics covered in Theory paper

Note: Paper will be set at the time of examination. Due weight age may be given to the practical notebook and Assignments in evaluation.

SECOND SEMESTER
Paper CA03: C Programming Language

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: The course will enable students to understand the basics of C programming language.

Note :

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

1. **Basics of 'C' Language:** History, Structure of a C program, Data types, Constants and variables, Operators and Expressions, I/O functions: Formatted & Unformatted Input/Output
2. **Control constructs:** If, If-else, nested if-else, else-if ladder, switch, goto, for, while, do... while, jumps in loops: break and continue

UNIT - II

3. **Preprocessor:** #define, #include, #undef, #conditional compilation directives (#if, #else, #elif, #endif, #ifdef and #ifndef), Storage classes, Header files (stdio.h, ctype.h, string.h, math.h, stdlib.h, time.h); Type casting, Type conversion, Scope Rules: Local and Global variables
4. **Functions:** library functions, user defined functions, scope rule of functions, Parameter passing: call by value and call by reference, calling functions with Arrays, Recursion: Basic concepts, Design examples (Tower of Hanoi)

UNIT - III

5. **Arrays:** Creating and using One dimensional and two dimensional arrays
6. **Strings:** Introduction to strings, declaring and initializing string variables, reading and writing strings, string handling functions
7. **Pointers:** & and * operators, Declaring and initializing pointers, Pointer expression, Pointer assignments, Pointer arithmetic. The dynamic memory allocation functions – malloc and calloc, Pointer vs Arrays, Passing Array to functions, Arrays of pointers, and Functions with variable number of arguments.

UNIT - IV

8. **Structures:** Basics of Structures, Declaring a structure, Referencing structure elements, Array of structures, passing structures to functions. **Unions:** Declaration, Uses; Enumerated data types, type def
9. **File Handling:** Introduction, creating a data file, opening and closing a data file, file Pointers, file accessing functions (fopen, fclose, putc, getc, fprintf); argc and argv; File opening modes: Text mode, Binary mode.

Suggested Reading :

Essential :

1. Yashavant P. Kanetkar : Let us C, BPB Publications, New Delhi.

Further Reading :

2. Balaguruswami : Programming with C Language, Tata McGraw Hill, New Delhi
3. Schaum Series: Programming in C, McGraw Hills Publishers, New York.
4. Salaria, R. S. : Application Programming in C, Khanna Book Publishing. New Delhi.
5. Salaria, R.S. : Test Your Skills in C, Salaria Publications, New Delhi.
6. Byron S. Gottfried : Programming in C, McGraw Hills Publishers, New York.
7. M.T. Somashekara : Programming in C, Prentice Hall of India.

Paper-CA04: Operating System Concepts

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: The course will enable the students to get familiar with concepts of operating system in general.

Note:

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

1. Operating System: Introduction, User view, system view, OS and its functions, Computer system operations, Storage structure, I/O structure, Computer system Architecture: Single processor systems, Multiprocessor systems, clustered systems, Distributed Systems, Special purpose systems: Real time embedded systems, Multimedia systems, Handheld systems

UNIT - II

2. Process Management: Process, Process life cycle, PCB, definition of Context switch and thread, CPU Scheduling: Basic concepts, Different types of schedulers, scheduling criteria, and Scheduling algorithm: FCFS, SJF, Priority, Round Robin, Multiple Queue scheduling and Multiple Feedback Queue scheduling
3. Deadlocks: System Model, Resource Allocation graph, necessary and sufficient conditions for Deadlocks, Introduction to methods for handling deadlocks, deadlock detection and recovery

UNIT - III

4. Memory management: Logical vs Physical address space, Dynamic loading and linking, Swapping, Introduction to Paging and Segmentation, Virtual Memory-Demand paging
5. Introduction to Page replacement algorithms: FIFO, Optimal, LRU, Stack algorithms and LRU approximation

UNIT - IV

6. File System: File System structure, Allocation methods, contiguous allocation, linked allocation, indexed allocation; Directory Structure: Single level, Two level, Tree and Acyclic structure; Directory implementation-linear list, hash table; Free Space Management- Bit vector, linked list, grouping
7. Device Management: Disk structure, disk scheduling, FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling algorithms, Control of various devices. Device drivers, Interrupt driven and poll driven data transfers

Suggested Reading :

Essential :

1. Abraham Silverschatz & Peter B Galvin : OS Concepts, Addison Wesley

Further Reading :

2. Donovan . John J. : System Programming, McGraw-Hill
3. Singhal, : Advanced Concepts in Operating System, McGraw Hill.

Paper PCA02: Practical based on CA03

Total Periods: 60
(6 Periods/week)

Max. Marks: 30
Exam Hours: 3

- Developing and writing Programs in C Language to demonstrate -
 - The use of constants, Variables, operators and expressions
 - Input and output statements, library functions
 - Conditional statements: if-else, nested-if, switch
 - Branching statements: Jump statements, break, continue, goto
 - Loops: while, do-while, for
 - Functions, recursive functions
 - Call – by value/reference
 - Arrays - Single and Multidimensional Array
 - String handling
 - Pointers, passing pointers to functions, pointers and arrays
 - Structure – accessing members, nested structures, structure with pointers
 - File handling , Creating and processing data files
 - Use of command line arguments

Third Semester
Paper CA05: Programming in C++

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: The course enables the students to get familiar with the features of Object Oriented programming language using C++.

Note:

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

Introduction to Object Oriented Programming Concepts: Object, Class, Encapsulation, Data hiding, Inheritance and Polymorphism; analysis and design of system using object oriented approach

C++ Basics: Token, keywords, Identifiers, Basic data types, user defined and derived data types, symbolic constants, declaration of variables, dynamic initialization of variables, reference variables, operators in C++, I/O streams, Control structures

Classes and Objects: Specifying a class, defining data members and member functions, private and public member functions, member function definition inside/outside the class declaration, scope resolution operator, nesting of member functions, creating and declaring objects, accessing class data members, accessing member functions, static data members and member functions

UNIT - II

Constructors and destructors: Introduction, default constructors, parameterized constructors, multiple constructors in a class, copy constructors, dynamic constructors; Destructors: Definition and use

Functions in C++: Function prototyping, pass by value, pass by reference, In line functions, default arguments, const arguments, function overloading, Friend functions, Objects as function arguments, friendly functions, returning objects

Arrays and Strings: creating and manipulating arrays with in a class, arrays of objects, Creating and manipulating String Objects, Accessing Characters in strings

UNIT - III

Extending Classes using Inheritance: Introduction, base class, derived class, defining derived classes, visibility modes: private, public, protected; single inheritance: privately derived, publicly derived; making a protected member inheritable, access control to private and protected members by member functions of a derived class, multilevel inheritance, virtual base classes, abstract classes, nesting of classes

Pointers, Virtual Functions and polymorphism: virtual and pure virtual functions, Function overloading, operator overloading

UNIT - IV

Console I/O Operations: C++ Stream Classes, Unformatted I/O functions-put(), get(), getline(), write(), Formatting with ios class functions and flags, Manipulators

Files and Streams: Text and binary streams, The stream class hierarchy, Processing files, declaring files, opening files using open() function or constructor function, closing files, String I/O, Sequential and random Access, File updation

Suggested Reading:

Essential :		
1.	Stroustrup, Bjarne	: C++ Programming Language, 3 rd Ed., Dorling Kindessley, Latest reprint.
Further Reading :		
2.	Robert Lafore	: Object Oriented Programming in Turbo C++, Galgotia Pub
3.	Balaguruswamy, E.	: Object Oriented Programming with C++, TMH., Latest reprint

Paper-CA06: Web Designing
Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: This course enables students to create web pages using HTML, CSS, Java script and dream weaver.

Note:

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

Web Terminology: Web Server; Web Client/Browser, Understanding how a Browser communicates with a Web Server, Internet, Intranet, Extranet, WWW, URL

Introduction to HTML: Structure of an HTML program, Paragraph Breaks, Line Breaks; Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.)); **Lists:** Unordered List, Ordered Lists, Definition lists; **Adding Images:** Img element using Border, Width, Height, Align, ALT Attributes; **Tables:** Caption Tag, Width, Border, Cell padding, Cell spacing, BGCOLOR, COLSPAN and ROWSPAN Attribute

UNIT - II

Linking Documents: Anchor tag, External Document References, Internal Document References and Image Maps

Frames: understanding frames, creating frames, Targeting Named Frames

Cascading style sheets (CSS): Style tag, Link tag, Types of CSS: In-Line, Internal, External

Forms: Attributes of Form element, Input element: Text Element, Password, Button, Submit Button, Reset Button, The Checkbox, Radio, TextArea, Select and Option

UNIT - III

Java Script: Features, tokens, data types, variables, operations, control constructs, strings arrays, functions, core language objects, client side objects, event handling. Applications related to client side form validation

Other Built-In Objects in JavaScript: The String Object, The Math Object, and The Date Object; User Defined Objects: Creating a User Defined Object, Instances, Objects within Objects

UNIT - IV

Creating WebPages using Dreamweaver: Introduction to Dreamweaver, Understanding Workspace Layout, Managing Websites, Creating a Website, Using Dreamweaver Templates, Adding New WebPages, Text and Page Format, Inserting Tables, Lists, Images, Adding Links.

Suggested Reading:

Essential :		
1.	Wanger & Wyke	: Java Script Unleashed, Pearson, Latest reprint New Delhi.
2.	Bayross, Ivan	: HTML,DHTML, JAVASCRIPT by BPB, Latest reprint
Further Reading :		
3.	Joseph Lowery	: Adobe Dreamweaver CS6 Bible by Wiley India
4.	Kogent Learning Solutions Inc	Dreamweaver CS5 in Simple Steps by Wiley India

Paper- PCA03: Practical based on Paper CA05 and CA06

**Total Periods: 60
(6 Periods/week)**

**Max. Marks: 30
Exam Hours: 3**

Write programs in C++ to demonstrate:

- The use of C++ operators, tokens and keywords.
- Input and output statements
- Control statements
- Functions (Function overloading, inline functions, friend functions).
- Classes (Object Declaration, Private and Public members, defining member functions)
- Data hiding and encapsulation
- Static data members and member functions
- arrays within a class, Array of objects
- Objects as function arguments
- Implementation of Constructor and Destructor.
- Operator Overloading (using member function and friend function)
- Inheritance (using visibility modes: Private, public, protected)
- All types of inheritance (multiple, multilevel, hybrid, hierarchical)
- Polymorphism (pointers to objects, Virtual Functions)

Design WebPages using HTML, DHTML, JavaScript, Dreamweaver

- Creating Time-Table of a student using tables
- Creating various lists using list tags
- Preparing Bio-Data using tables, images, formatting tags, lists
- Create a simple website using frames and other features of HTML
- Calculate expression using eval function
- Form Validation Using JavaScript event Handlers and functions
- Web site design using dream weaver

Note: Paper will be set at the time of examination. Due weight age may be given to the practical note-book and Assignments in Evaluation.

FOURTH SEMESTER
Paper CA07: Data structures

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: The course enables the students to get familiar with the basic concepts of data structures and develop programs using different concepts.

Note:

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

Basic Concepts: Introduction to data structure basics and notations, introduction to complexity

Arrays: Introduction, various operations on Arrays like insertion, deletion, searching (Binary and Linear Search) and Sorting (Bubble sort, Insertion sort, Selection sort)

UNIT - II

Linked list: Introduction, declaration, operations:-traversing, searching, inserting, deleting; Introduction to circular list

Stacks: Array representation of a stack, operations- initialization, push, pop, empty, and full; applications: Expression evaluation, expression conversion, recursion

UNIT - III

Queues: introduction, memory representation, operations- add, removes, initialization; applications

Trees: Definition and Basic concepts, Linked Tree Representation, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Searching, Insertion and deletion in Binary trees

UNIT - IV

Graphs: Graphs and their application, Sequential and Linked representation of Graph, Traversing a graph (DFS and BFS).

References :

- Lipschultz L. Seymour, 2001 : Data Structure, Schaum Outline Series, TMH, New Delhi.
- Tannenbaum, Aaro M., 1990 : Data Structure Using C, Pearson.

Suggested Reading:

Essential :			
1.	Lipschultz L. Seymour	:	Data Structure, Schaum Outline Series, TMH, New Delhi.
Further Reading :			
2.	Tannenbaum, Aaro M	:	Data Structure Using C, Pearson.
3.	Salaria, R. S.	:	Data Structures & Algorithm Using C; Khanna Book Publishing Co. (P.) Ltd., New Delhi.
4.	Sofat Sanjeev	:	Data Structure with C and C++, Khanna Book Publishing Co.

Paper CA08: Java Programming

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Objective: The course enables students to understand the basics of DBMS.

Note:

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

1. **Fundamentals of Java:** Introduction to Java and its features, Java Vs. C++, ByteCode, Java virtual machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructors, method overloading
2. **Inheritance:** Basics, member access, using super to call super class constructors, creating a multi level hierarchy, method overriding, Dynamic method dispatch, using abstract classes, using Final.

UNIT - II

3. **Arrays and String handling:** creating and using arrays, understanding string and StringBuffer class and various string functions
4. **Interfaces:** creating and using Interfaces, Implementing inheritance and multiple inheritance using Interfaces.
5. **Packages:** understanding packages and system defined packages, creating and using user defined packages

UNIT - III

6. **Exception Handling:** Fundamentals, exception types, using Try and catch, Multiple Try and Catch clauses, Nested Try statements, Built –in exceptions.
7. **Multi-threaded Programming:** Understanding Multithreading, Thread Life Cycle, Creating threads using The thread class and runnable Interface, creating Multiple Threads, Resuming and stopping Threads, Thread priorities, synchronizations

UNIT - IV

8. **Applet fundamentals:** Introduction, Types of applet, Life Cycle, Incorporating an applet into web page using Applet Tag, running applets; using Graphics class and its methods to draw lines, rectangles, circles, ellipses, arcs and polygons

Suggested Reading:

Essential :	
1.	Balaguruswamy, E. : Programming with Java, A Primer, TMH, New Delhi, Latest reprint
Further Reading :	
2.	Liang, Daniel : An Introduction to Java Programming, PHI, New Delhi, Pearson, Latest reprint
3.	Bayross, Ivan : Java 2 by BPB publication
4.	Schildt , Herbert : The Complete Reference Java 2, TMH, Latest reprint

Paper –PCA04: Practical based on CA07 and CA08

Total Periods: 60
(6 Periods/week)

Max. Marks: 30
Exam Hours: 3

Write programs in C++ to demonstrate:

- **the operations on various data structures.**

Write programs in Java to demonstrate:

- Implementation of Classes and Objects
- Constructors and their types
- Inheritance – calling super class constructors, abstract classes, multilevel hierarchy
- Method overloading and overriding
- String handling
- Creating Packages and Interfaces: Defining an Interface, Importing packages
- Implementation and handling of built-in and user defined exceptions
- I/O streams
- Applet programming

Note: Paper will be set at the time of examination. Due weight age may be given to the practical note-book and Assignments in Evaluation.

FIFTH SEMESTER

Paper – A: Programming with VB.NET and Oracle

Total Periods: 60
(6 Periods/week)

Max. Marks: 65
Exam Hours: 3

Objective: The course is designed to enable the students to develop applications using event driven programming with VB.net (as front end) and oracle (at back end).

Note :

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

1. **Overview of the Visual Studio .NET IDE:** Menu Bar and Tool Bar, Solution Explorer, ToolBox, Properties, Displaying and printing Text, Displaying Image, Arithmetic, relational operators, Control structures (branching, looping) , assignment operators.
2. **Procedures :** Introduction, Modules, classes, sub Procedures, function procedures, passing arguments (pass by value versus pass by reference), Recursion: factorial, Fibonacci series
(No. of Lectures: 15)

UNIT - II

3. **Arrays and Strings:** Declaring and allocating Arrays, passing Arrays to procedures. Sorting
Arrays using Bubble Sort, searching Arrays using Linear Search, Binary Search, String functions.
4. **Accessing Data with ADO.NET:** Understanding ADO.net Object model, architecture, and components, Database, Connecting to and querying an access data source, Creating Applications which can Insert, Delete, and Update information from a database using SQL statements, viewing data using Data Grid View Control.

(No. of Lectures: 15)

UNIT - III

5. **Fundamentals:** Introduction to DBMS, Architecture, The 12 Rules (Codd's Rule) for RDBMS, Normalization, Introduction to SQL, Oracle Data Types, Starting SQL Plus, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, ordering the result of a Query Aggregate Functions, Grouping the Result of a Query, ROLLUP Operation: Getting Sub Totals, CUBE Operation: Getting Cross Tabs, Command Summary of SQL Plus Editor.

6. Querying Multiple Tables: Equi-Joins, Cartesian Joins, Outer Joins, Self-Joins, SET Operators: Union, Intersect, Minus; Nested Queries; Functions: Column Functions, Arithmetic Functions, Character Functions, Date Functions, General Functions, Group Functions.

(No. of Lectures: 15)

UNIT - IV

7. Data Definition Language (DDL): Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Views, Manipulating the Base table(s) through views, Rules of DML, Statements on Join Views, Dropping a View, Inline Views, Materialized Views. Database Security and Privileges, Grant and Revoke Command, Privileges Management, Enhancing Performance, Sequences, COMMIT and ROLLBACK.
8. PL/SQL: Introduction to PL/SQL, PL/SQL Block Structure, PL/SQL Architecture, PL/SQL Data Types, Variables and Constants, Scope and Visibility of a Variable, Assignments, Expressions, Operator Precedence, Referencing Non-PL/SQL Variables, Built-in-Functions, Conditional and Iterative Control, SQL Within PL/SQL, Writing PL/SQL Code, Composite Data types, Cursor Management in PL /SQL, Cursor Manipulation, Implicit cursor Attributes, Exception Handling in PL/ SQL, Predefined Exceptions, User Defined Exception.

(No. of Lectures: 15)

Suggested Reading:

1	Visual Basic.NET How to Program	:	Deitel, Pearson Education, Low Price Edition, 2001.
2.	Sams Teach Yourself Visual studio.net in 21 days		Jason Beres, SAMS, 2003.
3	Introduction to Database Sytems		C.J.Date, Pearson 2006.
4.	Database System Concepts		Korth, TMH, 2010.
5.	Kevin, Loney	:	The Complete Reference Oracle Database 10g, TMH, 2004.
6	Anurag Gupta		Database Concepts.

Paper – B : Practical on Paper - A

Total Periods: 6 per week

Max. Marks: 25

- Development of any minor application using VB.net (Front End) and Oracle (Back End). The evaluation of Project will be done on the basis of Project report submitted by the candidate and Vive Voce examinations.

SIXTH SEMESTER

Paper – B : Operating Systems

Total Periods: 60
(6 Periods/week)

Max. Marks: 65
Exam Hours: 3

Objective: The course enables the students to get familiar with major functions of Operating System and also covers a case study of Operating System using LINUX.

Note :

- i. The Question Paper will consist of Four Units.
- ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
- iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
- iv. All questions carry equal marks unless specified.

UNIT - I

Operating System: Software Classification, Functions of Operating System. Interaction of Operating Systems with hardware and user programs; Multi-user, Multitasking, Multiprocessing and Real time operating systems, Parallel Systems, Distributed Systems

Memory management: Logical versus Physical address space, Swapping, Paging, and Segmentation, Virtual Memory-Demand paging, Page replacement algorithms

(No. of Lectures : 15)

UNIT - II

Processor Management: Process Scheduling and definition of Context switch and threads. CPU Scheduling: Basic concepts, scheduling criteria, and Scheduling algorithms, Deadlocks-methods for handling deadlocks, deadlock detection and recovery.

(No. of Lectures :15)

UNIT - III

File System: File System structure, Allocation methods, contiguous allocation, linked allocation, indexed allocation; Free Space Management- Bit vector, linked list, grouping; Directory implementation-linear list, hash table.

Device Management: Disk structure, disk scheduling, FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling algorithms Control of various devices. Device drivers, Interrupt driven and poll driven data transfers

(No. of Lectures :15)

UNIT - IV

Linux: Introduction to Linux, Linux commands (Directory and file handling), Introduction to File Access Permissions, Administration of Linux Operating System : Opening of new accounts, job scheduling, performance tuning,

(No. of Lectures : 15)

Suggested Reading:

Essential :		
1.	Abraham Silberschatz & Peter B Galvin	: OS Concepts, Weley Judil, 2009.
2.	Norton, Peter	: Complete guide to LINUX, SAMS, 1999.
Further Reading :		
3.	Donovan . John J.	: System Programming, McGraw-Hill, 2012.
4.	Singhal,	: Advanced Concepts in Operating System, McGraw Hill, 2011.
5.	Milenkovic, Milan	: Operating System McGraw Hill.
6.	Madnick and Donovan	: Operating System McGraw Hill.
7.	Komarinski, Mark F.	: LINUX System Administration Handbook, AW. Prentice Hall, 1998.
8	Parker, Tim	: Linux Unleashed Third Edition, Techmedia, 1999.
