FACULTY OF SCIENCE

SYLLABI

FOR

COMPUTER APPLICATIONS (ELECTIVE)

1st, 2nd & 3rd Year

(SEMESTER SYSTEM)

PART-I, II, III

(First to Six Semester)

For

2019 - 2020 SESSION

--:O:--
PANJAB UNIVERSITY, CHANDIGARH.

Computer Applications (Elective) for B.A./B.Sc./B.Com. I, II, III (Examination 2019 - 20)

SUMMARY CHART
COMPUTER APPLICATIONS

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Paper</th>
<th>Name of Paper</th>
<th>Lectures per week</th>
<th>Max. Marks</th>
<th>Exa. Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>CA01</td>
<td>Fundamentals of IT</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>CA02</td>
<td>Application Software</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>PCA01</td>
<td>Practical Based on CA01 and CA02</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>4</td>
<td>CA03</td>
<td>C Programming Language</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>CA04</td>
<td>Operating System Concepts</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>PCA02</td>
<td>Practical Based on CA03</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td><strong>Third Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>7</td>
<td>CA05</td>
<td>Programming in C++</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>CA06</td>
<td>Web Designing</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>PCA03</td>
<td>Practical Based on CA05 and CA06</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td><strong>Fourth Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>10</td>
<td>CA07</td>
<td>Data Structure</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>CA08</td>
<td>Java Programming</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>PCA04</td>
<td>Practical Based on CA07 and CA08</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td><strong>Fifth Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>13</td>
<td>CA09</td>
<td>Programming with VB. NET</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>CA10</td>
<td>Database Management using Oracle</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>PCA05</td>
<td>Practical Based on CA09 and 10</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sixth Semester</strong></td>
<td></td>
<td></td>
<td>Ext.</td>
<td>Int.</td>
<td>Total</td>
</tr>
<tr>
<td>16</td>
<td>CA11</td>
<td>Computer Networks</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>CA12</td>
<td>Working with Linux</td>
<td>6</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>PCA06</td>
<td>Practical Based on CA12</td>
<td>6</td>
<td>30</td>
<td>-</td>
</tr>
</tbody>
</table>
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.


Suggested Reading:

Essential:

Further Readings:
4. Fundamentals of Computers, PHI, New Delhi
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 :

2. OOoAuthors Team : Getting Started with OpenOffice.org 3.3, Friends of OpenDocument
Paper – PCA01: Practical based on CA01 and CA02

Total Periods: 60          Max. Marks: 30
(6 Periods/week)         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         Max. Marks: 30+5
(6 Periods/week)        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
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:

Further Reading:
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**


**UNIT - II**

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

Note:
1. The Question Paper will consist of Four Units.
2. Examiner will set total of NINE questions comprising TWO questions from each Unit and ONE compulsory question of short answer type covering whole syllabi.
3. The students are required to attempt ONE question from each Unit and the Compulsory question.
4. 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:**

**Further Reading:**
Paper-CA06: Web Designing
Total Periods: 60                                        Max. Marks: 30+5
(6 Periods/week)                                          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**

*Suggested Reading:*

<table>
<thead>
<tr>
<th>Essential</th>
<th></th>
<th>Further Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Bayross, Ivan</td>
<td>HTML, DHTML, JAVASCRIPT by BPB, Latest reprint</td>
<td>4. Kogent Learning Solutions Inc</td>
</tr>
</tbody>
</table>
Paper- PCA03: Practical based on Paper CA05 and CA06

Total Periods: 60                      Max. Marks: 30
(6 Periods/week)                      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.
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:


Suggested Reading:

<table>
<thead>
<tr>
<th>Essential</th>
<th>Further Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lipschultz L. Seymour</td>
<td>Data Structure, Schaum Outline Series, TMH, New Delhi.</td>
</tr>
</tbody>
</table>
Paper CA08: Java Programming

Total Periods: 60  Max. Marks: 30+5
(6 Periods/week)  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:**

<table>
<thead>
<tr>
<th>Essential:</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Balaguruswamy, E.</td>
<td>Programming with Java, A Primer, TMH, New Delhi, Latest reprint</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Further Reading:</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Liang, Daniel</td>
<td>An Introduction to Java Programming, PHI, New Delhi, Pearson, Latest reprint</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Bayross, Ivan</td>
<td>Java 2 by BPB publication</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Schildt, Herbert</td>
<td>The Complete Reference Java 2, TMH, Latest reprint</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Arora, Indu</td>
<td>JAVA Programming</td>
<td></td>
</tr>
</tbody>
</table>
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-CA09: Programming with VB.NET**

Total Periods: 60  
(6 Periods/week)  
Max. Marks: 30+5  
Exam Hours: 3

**Note:**

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

**Objective:** The course is designed to enable the students to develop applications using event driven programming with VB.net.

**UNIT - I**

**Overview of the Visual Studio .NET IDE:** Introduction to .NET Framework and the Common Language Runtime, Introduction to Visual Studio.NET IDE: Menu Bar and Tool Bar, Design Window, Code Editor, Server Explorer, Solution Explorer, Toolbox, Properties Window, Object Browser, Class view Window, Working with windows forms and events, Adding different controls of Toolbox (TextBox, Label, CheckBox, RadioButton, Button, Frame, ListBox, ComboBox, PictureBox, ProgressBar, Timer) to Forms, Setting their Tab orders, enabling and disabling controls.

**UNIT - II**

**Basics of VB.Net:** Constants, Variables, data types, Operators: Arithmetic, Concatenation, Comparison, logical operators, and assignment operators, Control structures: If, if/then/else selection structures, Select case Multiple-selection structure, While, do while, do until, For/Next, For each repetition structure.
UNIT - III

**Procedures:** Introduction, sub Procedures, function procedures, event procedures, commonly used Form events, creating message boxes, input boxes and dialog boxes

**Arrays and Strings:** declaring and allocating Arrays, Using Strings and String functions: len, right, left, ucase, lcase, ltrim, trim

**Designing Menus:** The MenuStrip control and ToolStripMenuItem objects, working with Multiple Forms, Setting the Startup Form

UNIT - IV

**Working with Data and ADO.NET:** Understanding ADO.net Object model, components, Basic operations in ADO.net, Data Reader, Data Adapter and Data sets, connecting to and querying a data source, Using Data Grid view for viewing the records from tables.

**References:**

<table>
<thead>
<tr>
<th></th>
<th>Visual Basic .NET How to Program</th>
<th>:</th>
<th>Deitel, Pearson Education, Low Price Edition 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Visual Basic 2008 in simple steps</td>
<td>:</td>
<td>KoGent Solutions Inc., dreamTech Press</td>
</tr>
<tr>
<td>3</td>
<td>Sams Teach Yourself more Visual Basic .net in 21 days</td>
<td>:</td>
<td>Lowell Mauer</td>
</tr>
</tbody>
</table>
Note:

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

Objective: The course is designed to enable the students to understand basic database concepts and managing database using SQL queries.

\textbf{UNIT - I}

\textbf{Database Concepts:} Introduction to databases, need, database architecture, Terminology: Tuple, Degree, attributes, Domain, Primary key, Foreign keys, candidate keys; The 12 Rules (Codd’s Rule) for an RDBMS, Normalization: First, second and third Normal Form, Boyce Codd Normal Form

\textbf{UNIT - II}

\textbf{Understanding SQL-1:} Data Types, 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, 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, creation and deletion of Views

\textbf{UNIT - III}

\textbf{Understanding SQL-II:} Managing privileges with Grant and Revoke Command, COMMIT and ROLLBACK, Functions: Arithmetic Functions, Character Functions, Date Functions, Group Functions, Querying Multiple Tables using Equi-Joins, Cartesian Joins, Outer Joins, Self-Joins, SET Operators: Union, Intersect, Minus; Introduction to Nested Queries

\textbf{UNIT - IV}


\textbf{References:}

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Database Systems</td>
<td>C.J. Date</td>
</tr>
<tr>
<td>2</td>
<td>Database System Concepts</td>
<td>Korth</td>
</tr>
<tr>
<td>3</td>
<td>Anurag Gupta</td>
<td>Database Concepts</td>
</tr>
</tbody>
</table>
Paper PCA05: Practical Based on CA09 and CA10

Total Periods: 60  Max. Marks: 30
(6 Periods/week)  Exam Hours: 3

- Development of programs using VB.Net
  - Use Controls to create User Interface, Connect with database and navigate between records of a Table; Create applications which can Insert, Delete, and Update data in a database using SQL statements

- Practice of SQL and PL/SQL Commands
  - DDL Commands: Create, Rename, Alter, delete Tables, views
  - DML Commands: All variations of Select, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table
  - Joins: Equi-Joins, Outer Joins, Self-Joins
  - Set operators: Union, Intersect, Minus
  - Functions: Character, Date and Group Functions.
  - COMMIT and ROLLBACK, Grant and Revoke Command
Sixth Semester
Paper CA11: Computer Networks

Total Periods: 60 (6 Periods/week)
Max. Marks: 30+5
Exam Hours: 3

Note:

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

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

UNIT - I
Introduction to Computer networks and applications: Network Structure and Architecture, 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 on the basis of Geographical Span (PAN, LAN, MAN and WAN). LAN topologies (Bus, Ring, Star, Mesh, Tree and Hybrid).

Network Connecting Devices: Repeaters, Hubs, Bridges, Routers, Gateways and Switches

Introduction to Data Communication: Analog Signal, Digital Signal, Analog vs Digital Communication

UNIT - II
Network models: OSI reference model, TCP/IP model and their Comparison.

Physical Layer: Types of Transmission media, Guided (Twisted-pair, Coaxial and Optical fiber) and Unguided (Radio, Microwave and infrared), Switching: Circuit switching, Packet Switching, Message Switching, modems, Modulation techniques: AM, PM, FM; Multiplexing Techniques: definition and Types.

UNIT - III

UNIT - IV
The Network Layer: Design Issues, Routing Algorithms (Shortest Path, Flooding, Flow Based, Distance Vector, Link State, Broadcast), Congestion Control Algorithms and their general principles (Leaky Bucket, Token Bucket)

References:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tanenbaum, Andrew S.</td>
</tr>
<tr>
<td>2.</td>
<td>Behrouz A. Forouzan</td>
</tr>
</tbody>
</table>
Paper CA12: Working with Linux

Total Periods: 60
(6 Periods/week)
Max. Marks: 30+5
Exam Hours: 3

Note:

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

Objective: The course enables the students to get familiar with LINUX Operating system.

UNIT - I

Introduction to Linux: Kernel, Linux's shell, Features of Linux, History, Minimum system requirements, Boot and Root disks, Starting and stopping Linux system, passwords, logging in and out, terminal Handling commands: who, Understanding wildcards, Environment variables, Understanding I/O Redirection and Piping: Introduction, cut, paste, sort, tee; Introduction to Regular Expressions and grep, Process Management: Types of processes, managing processes with ps, bg, fg, nice, kill

UNIT - II

Using file system: Introduction to common types of files, Filenames, Introduction to different types of directories: Parent, Subdirectory, Home directory; rules to name a directory, understanding Important directories in Linux File System, Absolute and relative filenames, creating and using files and directories(mkdir, cd cat), listing files (ls, ls-l), pwd, moving and copying files and directories (mv, cp), Removing files and directories(rm, rmdir), using wildcards with files and directories, File and directory permissions using relative and absolute methods, Changing group ownership, umask settings

UNIT - III

Vi editor: starting vi, vi modes, inserting text, quitting vi, deleting text, copying and moving text, searching and replacing text

Introduction to shell programming: Defining Variables, Unsetting Variables, Environment Variables, Substitution, Filename Substitution (Globbing), Variable Substitution, Command and Arithmetic Substitution, Quoting, Quoting with Backslashes, Using Single Quotes, Using Double Quotes, Quoting Rules and Situations, The if Statement, The case Statement, The while Loop, The for and select Loops, Loop Control

UNIT - IV

Understanding System Administration activities: Superuer (su) command, Taking backups using tar, Managing disk space with df and du, Mounting and Un-mounting file system with mount and unmount, Managing users

References:
- Tim Parker, Linux Unleashed Third Edition, Techmedia, BPB
- Sams Teach Yourself Shell Programming in 24 Hours
- Norton, P., Complete guide to LINUX, Techmedia
- John Goerzen: Linux Programming Bible, IDG Books, New Delhi
Practically executing Linux commands
Write simple shell programs.