

Bachelor of Computer Applications (BCA)

Three year (Six Semester) Course

The course of study of Bachelor of Computer Applications (BCA) shall extend over a period of **six semesters** spread over three years. On satisfactory completion of the course and after passing the examinations, a candidate will be awarded the Bachelor of Computer Applications degree.

Every academic year shall be divided into two semesters. I semester starts from July and ends in December. II semester starts from January and ends in June and so on. There shall be an examination at the end of each semester. The examinations shall consist of theory papers, practical papers.

The examination of each semester will consist of four theory papers, and three practical papers.

Medium of instructions and examination will be **English** only.

Examination Scheme:

Each theory paper shall be of 100 marks (70 marks for written examination of 3 hrs duration and 30 marks for internal assessment).

Each practical paper shall be of 100 marks (60 for practical exam and 40 for internal assessment).

The basis for internal evaluation in theory shall be home assignment, internal test and regularities in the attendance.

The basis for internal assessment in the laboratory courses shall be timely submission of the lab. records, performance in the lab., internal tests etc.

Each theory paper examination will be of three-hour duration and shall carry 70 marks. Theory paper shall contain three parts.

- a) Part A, will contain 12 questions (student will attempt any 10) of very short questions each carrying 1 mark.
- b) Part B, will contain 4 short descriptive types of questions (1 from each unit) each carrying 5 marks, all are compulsory.
- c) Part C, will contain 4 long descriptive types of questions (1 from each unit) each carrying 10 marks, all questions are compulsory with internal choice.

Each practical examination (Maximum marks 100) will be of four- hour duration on one day and carry 60 marks for exercise(s) assigned in the examination and Viva , and 40 marks for the Internal Assessment.

S.No.	Question Pattern	Max. Marks (Theory)		Max. Marks (Practical)	
		ESE	CIA	ESE	CIA
1	Part A: 12 Very Short Questions (attempt any 10 questions)	10 X 1=10			
2	Part B: 4 Short Question from each Unit (Compulsory)	4 X 5 =20			
3	Part C: 4 Questions from each Unit with Internal Choice	4 X 10=40			
Sub Total		70	30	60	40
		100		100	

Attendance:

A candidate shall be required to put in a minimum of 75% attendance at the lectures and 75% attendance at the practical's separately in each paper.

Examination Scheme

Sr. No.	Paper	ESE	CIA	Total
1	Theory	70%	30%	100
2	Practical	60%	40%	100

**Maximum Marks for the Course and Number of Units of Each subject
3 Years / 6 Semesters**

Sr. No	Stream	Semester	Number of Papers per semester		Total Marks of 1 Semester	Sub Total	Grand Total
			Theory	Practical			
1	BCA						
		I,II, III, IV and V Sem	4 X 100	3 X 100	400 +300 = 700	700 X 5 = 3500	3500
		VI Sem Project	4 X 100	1 X 300	400+300 = 700	700 X 1 =700	700
							4200

Award of Division and Grade:

To award Division and Grade to students the total of two internal assessment & End term semester exam marks in all subjects will be considered. Over all merit / rank of student will be declared after compilation of marks / grade secured by the candidate in all the semesters of that course.

The distribution is as follows.

% of Marks	Division	Grade
90.01 % and above	I	Outstanding
80.01 – 90.0%	I	A++
70.01 – 80.0%	I	A+
60.0 – 70.0%	I	A
54.01 – 59.99%	II	B
48.01 – 54.0 %	II	C
40.01 – 48.0%	Pass	D
Less than 40.0%	Reappear/Fail	E

Semester Structure (BCA)

Semester – I

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA101	Fundamentals of Computer Science	4	70	30	3	4
PBCA102	PC Software (for Session 2013-14 only) Electrical Circuit and Semiconductor Physics	4	70	30	3	4
PBCA103	Programming in C	4	70	30	3	4
PBCA104	Basic Mathematics (for Session 2013-14 only) Discrete Mathematics	4	70	30	3	4
	Practical Papers					
PBCA151	Programming in C Lab.	4	60	40	4	3
PBCA152	Office Management Lab.	4	60	40	4	3
PBCA153	Communication Skills Lab. (for session 2013-14) ECSP Lab	4	60	40	4	3
	Total	28	460	240	24	25

Semester – II

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA201	Object Oriented Programming Concepts	4	70	30	3	4
PBCA202	Internet & Web	4	70	30	3	4

	Technologies					
PBCA203	Digital Electronics & Circuit	4	70	30	3	4
PBCA204	Computer Architecture	4	70	30	3	4
	Practical Papers					
PBCA251	C++ Lab.	4	60	40	4	3
PBCA252	Internet & Web Lab	4	60	40	4	3
PBCA253	DEC Lab.	4	60	40	4	3
	Total	28	460	240	24	25

Semester – III

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA301	Data Base Management System	4	70	30	3	4
PBCA302	Advance Java Programming	4	70	30	3	4
PBCA303	Operating system Fundamentals	4	70	30	3	4
PBCA304	System Analysis & Design	4	70	30	3	4
	Practical Papers					
PBCA351	DBMS Lab.	4	60	40	4	3
PBCA352	Java Lab.	4	60	40	4	3
PBCA353	Communication skill & Group Discussion	4	60	40	4	3
	Total	28	460	240	24	25

Semester – IV

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA401	Data Structure & Algorithms	4	70	30	3	4
PBCA402	PHP Programming	4	70	30	3	4

PBCA403	Advance Database Concepts	4	70	30	3	4
PBCA404	Data Communication and Networking	4	70	30	3	4
	Practical Papers					
PBCA451	Data Structure Lab.	4	60	40	4	3
PBCA452	PHP Lab.	4	60	40	4	3
PBCA453	PL/SQL Lab.	4	60	40	4	3
	Total	28	460	240	24	25

Semester – V

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA501	Computer Graphics	4	70	30	3	4
PBCA502	DotNet Technologies	4	70	30	3	4
PBCA503	E-Commerce Application Development	4	70	30	3	4
PBCA504	Software Engineering	4	70	30	3	4
	Practical Papers					
PBCA551	Graphics Lab.	4	60	40	4	3
PBCA552	DotNet Lab	4	60	40	4	3
PBCA553	SRS Report Presentation	4	60	40	4	3
	Total	28	460	240	24	25

Semester – VI

Code	Theory Papers	Teaching per week Hours	End Semester Exam (ESE)	Continuous Internal Assessment (CIA)	Exam Hours	Credits
PBCA601	Management Information System	4	70	30	3	4
PBCA602	Network Security and	4	70	30	3	4

	cryptology					
PBCA603	Data Warehousing and Data Mining	4	70	30	3	4
PBCA604	Elective Papers: Artificial Intelligence and Expert Systems	4	70	30	3	4
PBCA605	Animation and Multimedia					
	Practical Papers					
PBCA651	Project	12	200	100	4	9
	Total	28	480	220	16	25

BCA –I Semester

PBCA101: Fundamentals of Computer Science

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Introduction to Computers: Characteristics of computers, evolution of computers, generation of computers, classification of computers, applications of computers.

Input and Output Devices: Keyboard, pointing devices, speech recognition, digital camera, scanners, optical scanners. Classification of output devices, hard copy output devices- printers, plotters, computer output microfilm (COM), soft copy output devices- monitors, audio output, projectors, and terminals.

UNIT- II

Computer System: Central processing unit (CPU), memory, instruction format, instruction set.

Primary and Secondary Memory: Memory hierarchy, random access memory (RAM), types of RAM, read only memory (ROM), types of ROM. Classification of secondary storage devices, magnetic tape, magnetic disk, optical disk.

Number Systems: Number systems, conversion between number bases.

UNIT- III

Computer Program: Introduction, developing a program, algorithm, flowchart, pseudo code.

Computer Languages: Introduction, classification of programming languages, generations of programming languages, features of a good programming language.

Computer Software: Software definition, relationship between software and hardware, software categories, system software, application software.

UNIT-IV

Operating System: Introduction of operating system, types of operating system, functions of an operating system, modern operating systems.

Data Communication and Computer Network: Introduction, data communication, transmission media, multiplexing, switching, computer network, network topologies, communication protocols, network devices.

Internet Basics: Introduction, evolution of Internet, basic Internet terms, getting connected to Internet, Internet applications, electronic mail, searching the web (search engines), languages of Internet, viruses.

Reference Books:

1. Introduction to computer Science, IITL Education solution Limited, R&D Wing, PEARSON Education.
2. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Computer Fundamentals by P.K. Sinha; BPB Publication, New Delhi 8.

PBCA102: PC Software (For session 2013-14 only)

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks: 40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Introduction to Operating System: Introduction to Operating system, FAT and NT file systems, file and directory structures and naming rules of files, booting process, system files. Dos Commands (internal & external)

Windows 98/XP/2000. Windows concept, features, Desktop, Taskbar, Start menu, My Computer, Recycle bin, Windows Accessories(Calculator, Notepad, Paint, Word Pad, Character Map, Windows Explorer, Entertainment, System Tools, Communication), Sharing information between programs.

UNIT-II

MS Word: Word processing, MS-Word features, creating saving and opening documents in Word, interface, toolbars, ruler, menus, keyboard shortcut, editing, previewing, printing & formatting a document, advance features of MS Word, find & replace, using thesaurus, mail merge, handling graphics, tables, converting a Word document into various formats like-text, rich text format, Word perfect, etc.

UNIT- III

MS Excel: Worksheet basics, creating worksheet, entering data into worksheet, data, text, dates, alphanumeric values saving & quitting worksheet, opening and moving around in an existing worksheet, Toolbars and menus, Keyboard shortcuts, working with single and multiple workbook, working with formula & cell referencing, Auto sum, coping formulas, absolute and relative addressing, formatting of worksheet, previewing & printing worksheet, Graphs and Charts, Database, macros, multiple worksheets-concepts.

UNIT- IV

Power Point: Creating and viewing a presentation, managing Slide Shows, navigating through a presentation, using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects.

Microsoft Access: Planning a database (tables, queries, forms, reports), creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure, Sorting and Indexing database, querying a database and generating reports.

Reference Books:

1. Microsoft; 2007 Microsoft Office System; PHI.
2. Microsoft; Microsoft Office 2003: Plain & Simple; PHI.
3. Microsoft; Microsoft Office XP: Plain & Simple; PHI.
4. Sanjay Saxena; A First Course in Computers 2003 Edition; Vikas Pub.

PBCA102: Electrical Circuit and Semiconductor Physics

(From session 2014-15 onwards)

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT-I

Electric charge, conductors and insulators, Coulomb's Law, quantization and conservation of electric charge, the electric field, electric lines of force and Gauss' Law of electrostatics, electric potential energy, electric potential, energy and electrical power.

Capacitors, capacitance, capacitors in series and parallel, capacitors with dielectric. Electric current, resistance, resistivity and conductivity, Ohm's law, electromotive force, series and parallel combination of resistances, current in a single loop, Kirchoff's current law, Kirchoff's Voltage law.

UNIT-II

Magnetic field due to a bar magnet, Biot Savrt's law, magnetic field due to a current carrying coil, Force between two parallel currents, Magnetic field inside solenoid and toroid, magnetic flux, Faraday's law of electromagnetic induction, magnetic properties of matter, (diamagnetic, paramagnetic, ferromagnetic and ferromagnetic materials), inductance, energy stored in an inductor, LR circuits.

UNIT-III

Structure of matter (Molecule, Atom), Atomic Structure (Energy levels and electronic configuration), Intermolecular forces, Phases of matter, Types of solids, crystal structure of solids, atomic bonding (ionic, covalent and metallic bonding), Energy band theory of crystals, energy band structure of insulators, semiconductors and metals.

Mobility and conductivity, Electrons and holes in Intrinsic Semiconductor, Elementary properties of Germanium and Silicon, Donor and Acceptor Impurities, Extrinsic semi-conductors.

UNIT – IV

Energy band structure of open circuit p-n junction, depletion region, p-n junction as a rectifier, Half-wave and Full-wave rectifiers, ripple factor, efficiency, Bipolar Junction transistors, bipolar transistor action, basic principle of operation open circuited transistor. Zener Diode, voltage regulation.

Reference books

1. Bernard Grob: Basic Electronics, Tata Mc Graw Hill.
2. Fowler: Electricity, Tata Mc Graw Hill.
3. Shivakumar, Engineering Physics, Tata Mc Graw Hill.
4. Iyer, Circuit Theory, Tata Mc Graw Hill.

PBCA103: Programming in C

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks: 40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Fundamentals of C: Programming Concepts, Pseudocode, Design of Algorithm & Flowchart, History and importance of C, sample programming, basic structure and execution of C programs, constants, variables, and data types and various type of declarations, different type operators and expressions, evaluation of expressions, operator precedence and associability. Managing input and output operations, decision making and branching decision making

UNIT- II

Iteration: while, do...while, for loop, nested loops, break & continue, goto statements.

Arrays and Strings: One-dimensional arrays and their declaration and initialization, two-dimensional arrays and their initializations, character arrays (One and Two dimensional), reading and writing strings, string - handling functions.

UNIT-III

Functions: Need and elements for user –defined functions, definition of functions, return values and their types, function calls and declaration, recursion, parameter passing, passing arrays and strings to functions, the scope, visibility and life time of variables.

Understanding Pointers: Accessing the address of a variable, declaration and initialization of pointer variables, accessing a variable through its pointer, pointers and arrays, pointers and function arguments, functions returning pointers.

UNIT -IV

Structures and Unions: Defining structure, declaring structure variable and accessing structure members, initialization of structure, operation on individual members, array of structures, union, size of structure.

I/O in C: Formatted and Un-formatted I/O, File handling (Random, Binary and Sequential).

Reference Books:

1. E. Balagurusamy – Programming in ANSI C, 3rd Edn. , TMH, New Delhi ; 2004.
2. Programming with C, B.S.Gottfried (TMH).
3. Y. Kanetkar – Let us C, 4th Edition, BPB Publication , New Delhi; 2002.
4. Kerighan & Richie The C programming language (PHI Publication).

PBCA104: Basic Mathematics **(For session 2013-14 only)**

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks: 40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT - I

Number Systems: natural numbers, integers, rational numbers, real numbers, complex numbers, arithmetic modulo a positive integer (binary, octal, decimal and hexadecimal number systems), radix r representation of integers, representing negative and rational numbers, floating point notation.

UNIT - II

Sets: Sets, subsets, equal sets, null set, universal set, finite & infinite sets, open & closed sets etc., operations on sets, partition of sets, Cartesian product of sets.

UNIT - III

Relations: Relation, properties of relations, equivalence relation, equivalence relation with partition, Mathematical Induction.

Functions: Function, domain and range, onto, into and one-to-one functions, composite functions, inverse functions.

UNIT - IV

2-Dimensional: Straight Lines- Distance between two points, coordinate of point dividing the join of two points in ratio m_1 , m_2 , (externally & internally) various forms & equation to a straight line, slope of the line.

Circle- equation of circle (central & general form) tangent at any point.

Parabola- standard & general equation of parabola, equation of tangent to the parabola.

Ellipse-standard equation of ellipse, equation of tangent.

Reference Books:

1. C.L. Liu: Elements of Discrete Mathematics, Tata Mc-Graw Hill Publishing Company Ltd., 2000
2. Richard Johnsonbaugh: Discrete Mathematics, Pearson Education, Asia, 2001
3. John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
4. Basic maths, R.D. Sharma

PBCA104: Discrete Mathematics

(From session 2014-15 onwards)

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks: 40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Introduction to number system, Codes (Natural BCD, Excess-3, Gray, Octal, Hexadecimal, Alphanumeric-EBCDIC and ASCII), Excess-3, Gray, Octal, Hexadecimal, Alphanumeric- EBCDIC AND ASCII), Error Codes, Sets Theory, Types of Sets, Multi Sets, Operations on Sets

UNIT -II

Relations and Properties of Relations, Combinatorics: Permutations and Combinations, Pigeon Hole Principle, Principle of Inclusion and Exclusion, Principle of mathematical induction,

UNIT- III

Proposition and Propositional Calculus: Proposition, Conjunction, Disjunction, Negation, Compound proposition, Conditional propositions and Logical equivalence, De Morgan's law, quantifiers, valid argument, deductive reasoning, modus ponens (rules of inference), universal instantiation, universal generalization, existential instantiation, universal generalization resolution.

UNIT -IV

Graph Theory- Types of Graphs, Path and Circuits, Eulerian Path and Circuits, Hamiltonian Path and Circuits, Shortest Path Algorithms, isomorphism of graphs, planar graphs, Trees, characterization of trees, spanning trees, breadth first search and depth first search method, minimal spanning trees.

References

1. C.L. Liu: Elements of Discrete Mathematics, Tata Mc-Graw Hill Publishing Company Ltd., 2000
2. Richard Johnsonbaugh: Discrete Mathematics, Pearson Education, Asia, 2001
3. John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
4. Robert J. McEliece: Introduction to Discrete Mathematics, Tata Mc. Graw Hill, India
5. Lipschutz: Discrete Mathematics, Tata Mc. Graw Hill, India
6. Kenneth H. Rosen, Discrete Mathematics and Applications, Tata Mc. Graw Hill, India

PBCA151: Programming in C Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA152: Office Management Lab.

DOS Commands

MS-Word Creating and Saving documents, Entering, Editing, Moving, Copying and Formatting Text, Page formatting, Finding and replacing text, Spell checking and Grammar checking, enhancing documents, Indexing, Columns, Tables and feature there in, Inserting (Objects, picture, files etc.), Using Graphics, templates and wizard, using mail merge, using Word Art, customizing MS Word. Designing pages with MS Publisher, Inserting and Manipulating Objects. Editing Fills and recoloring pictures.

MS Excel Spreadsheet terminology, organization of the worksheet area, entering information, editing cells using commands and functions, moving copying, inserting and deleting rows and columns, formatting worksheet, printing worksheet, creating charts, modifying and enhancing charts, using date, time and addressing modes, naming range and using statistical, mathematical and financial functions, database in a worksheet, creating, sorting, querying and maintaining the database, multiple worksheets and Macros, working with objects.

MS Power Point Anatomy of a power Point Presentation, Creating and Viewing a presentation, Managing Slide Shows, Navigating through a presentation, Using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects, creating presentation for the web.

MS Access:

Planning a database (tables, queries, forms, reports), Creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure, maintaining database, Sorting and Indexing database, Querying a database and generating Reports, modifying a Report, exporting a Report to another format.

PBCA153: Communication Skills Lab. (*For session 2013-14 only*)

The development of effective communications skills for a business environment; the nature of communication; Written (reports, letters, electronic communications, etc.); oral (presentation skills) and interpersonal communications (Perceptions, listening; nonverbal communication, group dynamics conflict, negotiations etc.).

PBCA153: Electric Circuit and Semiconductor Physics Lab. (*From Session 2014-15 onwards*)

Exercises to be framed so as to cover the topics and tools covered in theory paper.

BCA –II Semester

PBCA201: Object Oriented Programming Concepts

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Introduction to Object Oriented Concepts: Evolution of OOP, OOP Paradigm, advantages of OOP, comparison between functional programming and OOP approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading.

Introduction to C++: C++ tokens, data types, C++ operators, type conversion, variable declaration, arrays, statements, expressions, conditional statements, Jumping statements, loops, functions, pointers, structures.

UNIT-II

Classes and Objects: Classes, objects, defining member functions, arrays of class objects, pointers and classes, passing objects, constructors, types of constructors, destructors, this pointer, access specifiers, friend functions.

UNIT-III

Inheritance: Introduction, types of inheritance, Importance of Inheritance, Constructor and Destructor in derived classes, types of base classes, multiple inheritance.

Polymorphism: Function overloading, operator overloading, virtual functions, pure virtual functions

Unit-IV

File Management: Handling Data files (sequential and random), Opening and closing of files, stream state member functions.

Tem plates, Exception Handling

Reference Books:

1. Robert Lafore; Object Oriented Programming in C++; 4th Edition; Techmedia.
2. Balagurusamy E.; Object Oriented Programming C++; 4th Edition; TMH, 2009.
3. Venugopal, Rajkumar; Mastering C++; Tata Mcgrow Hill, 2006.
4. Kanetkar Y.; LET US C++; BPB; 2009.
5. Deitel and Deitel: How to Program C++, addison Wesley, Pearson Education Asia.
6. John R. Hubbard, Programming with C++, McGraw Hill International.

PBCA202: Internet and Web Technology

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Internet Basics: Basic concepts, communication on the internet, internet domains, internet server identities, establishing connectivity on the internet, client IP address, A brief overview of TCP/IP and its services, transmission control protocol, web server, web client, domain registration.

Introduction to HTML: HTML, HTML tags, commonly used HTML commands, text formatting, text style, lists, adding graphics to HTML documents, tables, linking documents, frames, Forms, Image Maps.

UNIT-II

Introduction to DHTML: features of DHTML, CSS: Types of Style sheets, Different elements of Style sheets, Filter effects, IFrame, DIV and Layer Tags.

Understanding XML: SGML, XML, XML and HTML, modeling XML data.

UNIT- III

Java Script: Java script in web pages, advantages of java script, advantages of java script, data types and literals, type casting , java script array, operators and expression, conditional checking , function, user defined function.

UNIT- IV

DOM Hierarchy: Different objects of DOM (window, navigator, history, form, frames etc.), Form validation, Event handling in Javascript.

Reference Books:

1. M.L. Young: Complete Reference b: Internet; 2nd Edition; Tata Mc Graw Hill,2006.
2. Thomas A. Powel ; Web Design : C.R.; Second Edition; TMH, 2009.
3. Thomas A. Powel ; HTML & XHTML : C.R.; Fourth Edition; TMH, 2008.
4. Harely Hahn: The Internet, Tata Mc Graw Hill.
5. G. Robertson: Hands on HTML, BPB Publications.
6. Joel Sklar: Principles of Web Design, BPB Publications.

PBCA203: Digital Electronics and Circuits

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Positive and negative logic, Logic functions-NOT,AND,OR NOR, EX-NOR, Truth tables, Boolean Algebra, de Morgan's theorems; Standard forms for logical expressions, Sum of Products, Product of Sums specification of logical functions in terms of Minterms and Maxterms, Karnaugh Maps, simplification of logical functions, introduction of "don't care" states, Synthesis using only NAND or only NOR gates.

Unit-II

Digital Logic Families : Characteristics of Digital ICs, Introduction to Bipolar Families (RTL, DCTL, DTL, ECL), Transistor as an amplifier, Characteristics of an amplifier. Feed-back concepts, Elementary information about Field Effect transistors, Introduction to Unipolar Logic families (PMOS, NMOS, CMOS), TTL Circuits, 7400, 74H00, 74L00, 74S00, 74LS00, 74AS00 series, Positive and Negative Logic, ECL OR/NOR Gates, ECL characteristics.

Unit-III

Combinational Circuits, Multiplexer-IC 74150 and IC 44151, De multiplexer-IC 74154, Decoder- IC 74139, BCD to Seven segment De-coder IC 7446/7447 IC 7448/7449 Decimal to BCD Priority Encoder-IC 7447, parity Checker-IC 741 80, Magnitude Comparator IC 7485.

Unit-IV

Sequential Circuits : RS Flip Flop, Clocked RS Flip Flop, D Flip Flop, Edge Triggered D Flip Flop, master-Slave Technology and its advantage, Shift Register as Flip Flop system, IC 7496, UP/DOWN counters, 74 series asynchronous counters, 74 series synchronous counter.

Reference Books :

1. Albert Paul Malvino and Donald P. Leach, Digital Principles and Applications, (Fourth Edition) Tata Graw Hill Publishing Company Ltd, New Delhi.
2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt. Ltd.
3. R.P. Jain, Modern Digital Electronic, Tata Mc Graw Hill Publishing Company Ltd. New Delhi.
4. Adel S. Se&a, and Kanneth C. Smith, Microelectronic Circuits, Oxford University Press.

PBCA204: Computer Architecture

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit I

Introduction to Logical Operations, laws of Boolean algebra and De-Morgan's Theorem, Principle of Duality

Digital Circuits:- Sum of Products (SOP) & Products of Sum (POS), Introduction to Combinational Circuits, Half-Adder, Half-Subtractor, Full Adder, Full Subtractor, Parallel Adder, Multiplexers, De- Multiplexers, Decoders, Encoders

Unit-II

Sequential Circuits:-Flip-Flops: RS, D using NAND and NOR gates, J-K Flip-Flop, T-Flip-Flop, J-K Master Slave Flip-Flop, edge triggered flip flops, Registers - SISO, SIPO, PISO, PIPO. Counters - Asynchronous and Synchronous, BCD counter, Decade Counter

Unit-III

CPU Design:-Timing and control, Instruction cycle, Memory Reference Instructions, Input-output and interrupt, complete computer description, design of basic computer, Instruction and addressing, instruction formats, addressing modes.

Unit-IV

Memory System Design: Main Memory Concepts, Cache Memory Organization, Associative Memory Concepts, Virtual Memory and Paging.

Input/output and Interfacing, DMA, I/O processors, Interrupts, RISC/CISC.

Suggested Readings

1. Mano Morris, Computer system architecture, PHI, New Delhi.
2. Mano Morris, M. Digital Design, PHI, New Delhi.
3. Kumar Anand. A., Fundamentals of Digital Circuits, PHI New Delhi.
4. Jain R. P., Modern Digital Electronics, Tata Mc Graw Hill , New Delhi.
5. Bartee Thomas, C., Digital Computer Fundamentals, Mc Graw Hill.
6. Microprocessor Architecture, Programming & Applications with 8085,Goankar, Penram International Publisher.

PBCA251: C++ Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA252: Internet & Web Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA252: DEC Lab.

In this lab the student must perform Ten experiments based on topics covered in the theory paper

BCA –III Semester

PBCA301: Database Management System

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Database System Concepts & Architecture: Overview of DBMS, Basic DBMS terminology, data base system v/s file system, data independence. Architecture of a DBMS, Schemas, Instances, Database Languages, Database Administrator, Data Models.

UNIT- II

Data Modeling: Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

Relational Algebra: Fundamental operations of relational algebra & their implementation, interdependence of operations.

UNIT -III

Database Design: Functional dependencies, loss less decomposition, 1st, 2nd & 3rd normal forms, dependency preservation, boyce codd NF. Introduction to Transactions, transaction states.

UNIT- IV

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, insert, update and delete operations, Joins, Unions, Intersection, Minus in SQL.

Reference Books:

1. Fundamental of Database Systems by R. Elmasri; S. Navate; Benjamin Cummings.
2. Introduction to database systems by C. J .Date.
3. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan, Tata McGraw Hill.
4. Principles of Database Management by James Martin.
5. Database Management Systems by Bipin Desai.

PBCA302:Advance Java Programming

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Introduction: Overview of Object Oriented Concepts in Java. Java features like security, portability, byte code, java virtual machine, object oriented, robust, multithreading, architectural neutral, distributed and dynamic.

Fundamentals of Java: Data types and control structures, operators, array.

Classes and Objects: Object References, Function Overloading, Constructor Overloading, Inheritance.

Unit-II

Packages and Interfaces: Access specifiers, Package creation, use of packages, Basics of Interfaces, Use of Interfaces, final, transient, static, volatile keywords.

Exception handling in Java: Exception raising & handling, Exception classes, Throwing exceptions, User defined Exceptions.

String handling: String and string buffer class and various string functions.

Threading in Java : Fundamentals of Multi-threading Java coding with Thread classes, thread Management in Java, Using Runnable interface.

Unit-III

AWT: Overview of AWT classes, Graphics primitives and GUI Components, Layout features, Standalone GUI applications, Layout Managers, Implementation of event driven mechanism, Delegation of event model, Listeners and Adapters.

Applets: Applet life cycle, Graphics facility, Color and Font, Passing parameters to applets.

Unit-IV

JDBC : JDBC Drivers, Two Tier and Three Tier client server model, Setting up a connection to database, Creating and executing SQL statements, Resultset and Resultset MetaData Object.

Java utilities: java.lang, java.util, java.io packages.

Reference Books :

1. C. Thomas Wu, An Introduction to OOP with Java, Mc Graw Hill.
2. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
3. E. Balaguruswamy, Programming with Java, Tata McGraw Hill.
4. Zukowski: Mastering Java 2, BPB Publications.
5. Herbert Schiildt, Java 2, Tata Mc Graw Hill.

PBCA303: Operating System Fundamentals

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT- I

Introduction to Operating System: Evolution of operating system, characteristics, types of operating system, function of operating system, concepts of process and files, systems calls.

Process Management: Process concept, process scheduling, process states. CPU scheduling: Types of schedulers, scheduling algorithms.

UNIT- II

Memory management: Logical and Physical address space, swapping, Contiguous allocating, multiple partitions, fragmentation compaction, paging, segmentation, Virtual memory management, demand paging, page replacement algorithms.

UNIT-III

Deadlock: The deadlock problem, characterization prevention, avoidance detection and recovery from deadlock, process concurrency concept, precedence graph. Critical section problem, semaphores and interprocess communication.

File-System: File concept, access methods, directory structure, protection. File-system structure. Directory implementation, allocation methods, free-space management.

UNIT- IV

Mass-Storage Structure: Disk structure, disk scheduling, disk management, swap-space management.

Security and Protection: Goals of protection, domain of protection, access matrix, implementation of access matrix; revocation of access rights.

Reference Books:

1. James L. Peterson & A. Silberschatz: Operating System Concepts.
2. Andrew S. Tenenbaum : Modern Operating Systems; Prentice Hall, India.
3. Systems Programming & Operating Systems, 2nd Edn., Tata Mc Graw Hill.
4. Operating System by Achyut Godbole.
5. Operating System by Galvin.

PBCA304: System Analysis & Design

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, and Interpersonal Communicational System.

System Development Life Cycle: Steps of SDLC

Unit-II

Feasibility Study: Types of feasibility, Steps in Feasibility Analysis

Role of the Systems Analyst. The Analyst/User Interface, Behavioral issues. Systems Planning and Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Unit-III

Information Gathering: need, Information about the firms, Information gathering tools, Interviewing, Arranging the Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Structure Charts, Decision Trees and Structured English.

Unit-IV

Testing and Implementation: System and Unit testing, Test cases: White box & Black box testing strategies: verification & validation, integration testing. Implementation Planning and Conversion techniques.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, and Requirements of form Design. H/W / S/W Selection, Make V/s Buy decision and Maintenance, Documentation: Importance,Types of documentation, Security and disaster planning and management.

Reference Books:

1. Igor Hawryszkiewycz, Introduction to System Analysis and Design, 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentley, Systems analysis and Design Methods 4th edition, Tata McGraw-Hill.
3. Philip L Weaver, Practical SSADM wer 4+A Complete Tutorial Guider, Pitman publishing, 1995.
4. Mark Lejk, and David Deeks, an Introduction to System Analysis Techniques Prentice Hall.
5. Don Yeates, Maura Shields and David Helmy, System Analysis and Design Longman group limited, 1994.

PBCA351: DBMS Lab.

1. Creating database tables and using data types.
 - Create table, • Modify table, • Drop table
2. Practical Based on Data Manipulation.
 - Adding data with Insert, • Modify data with Update, • Deleting records with Delete
3. Practical Based on Implementing the Constraints.
 - NULL and NOT NULL, • Primary Key and Foreign Key Constraint
 - Unique, Check and Default Constraint
4. Practical for Retrieving Data Using following clauses.
 - Simple select clause, • Accessing specific data with Where, Ordered By, Distinct and Group By
5. Practical Based on Aggregate Functions.
 - AVG, • COUNT, • MAX, • MIN, • SUM, • CUBE
6. Practical Based on implementing all String functions.
7. Practical Based on implementing Date and Time Functions.
8. Practical Based on implementing use of union, intersection, set difference.
9. Implement Nested Queries & JOIN operation.
10. Practical Based on performing different operations on a view.

PBCA352: Java Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA353: Communication & Group Discussion

BCA –IV Semester

PBCA401: Data Structure and Algorithms

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Algorithms, pseudocode, characteristics of algorithms, analyzing algorithms and problems, complexity measures, basic time analysis of an algorithm, space complexity. Data abstraction and basic data structures, data types, abstract data types.

String processing (storing strings, string operations, pattern matching algorithms).

Arrays and their representation in memory, insertion, deletion, merging, searching and sorting, multidimensional arrays, pointers, pointer arrays.

Unit-II

Linked lists: representation of linked list in memory, insertion, deletion and searching of linked list, two way, circular and header lists.

Stacks: array and linked list representation of stacks, arithmetic expressions, Polish notations, Recursion

Unit-III

Queues: Array and linked list representation of queues, dequeues, priority and circular queues.

Applications of Stacks and Queues.

Trees: Binary and N-ary trees, representation of binary trees in memory, traversing binary trees, traversal algorithms using stacks, binary search trees.

Unit-IV

Graphs and their representations, sequential representation, Warshall's algorithm, linked representation of graphs, operations on graphs, traversing a graph.

Sorting and Searching: Internal and external sorting techniques, Sequential, Binary and Hash searching,

Bubble sort, Insertion sort, Selection sort, Merge sort, Radix sort and quick sort, heapsort, algorithm comparisons.

Reference Books:

1. S. Lioschutz: Data Structures, Mc Graw Hill International Edition.
2. A.V. Aho., J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, Pearson Education Asia.
3. A. Michael Berman: Data Structures via C++, Oxford University Press.
4. Sara Baase and Allen Van Gelder: Computer Algorithms, Pearson Education Asia.
5. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications, TMH Publishing Co.Ltd.

PBCA402: PHP Programming

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT-I

Introduction to PHP: Server side Scripting Vs Client Side Scripting, Evaluation of Php, Features of Php, Basic Syntax, Variable and constant, Data types, Operators and Expressions

Decision Making: If, Multiple Ifs, Nested Ifs, Loops (while, do...while, for loop, foreach), Nested Loops, Jumping Statement.

Arrays: Numeric, Associative and Multidimensional Arrays

UNIT-II

Strings: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function, Pattern matching, Replacing text, Splitting a string with a Regular Expression

Functions: Defining a Function, Calling a Function, Parameter passing, Returning value from function

UNIT-III

Form Data Handling: \$_GET, \$_POST, \$_REQUEST Variables, Cookies handling, Session Management

Exception Handling: Understanding Exception and error, Try, catch, throw

UNIT-IV

File Handling: Opening and closing a file, Coping, renaming and deleting a file

Database Handling: Connection with MySql Database or ODBC, Performing basic database, operation (Insert, Delete, Update, Select), Setting query parameter.

References

1. PHP, The CompleteReference, Steven Holzner, TMH
2. Beginning PHP 5.3, Matt Doyle, John Wiley & Sons

PBCA403: Advance Database Concepts

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Transaction management: Basic concepts, Transaction states, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability.

Concurrency Control: Lock-based Protocols, Time stamp based protocols, Validation based protocols, Multiple Granularity, Deadlock handling.

Unit –II

Database System Architectures: Centralized and client-server architecture, server system architecture, Parallel Systems, Distributed Systems.

Object-based Databases: Complex Data Types, Structure Types and Inheritance in SQL, Table Inheritance, Persistent Programming Languages.

Unit-III

Distributed Databases: Distributed Data Storage, Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases.

Parallel Databases: I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Design of Parallel Systems.

Unit-IV

PL/SQL basics, blocks, architecture, variables and constants, attributes, character set, PL/SQL sentence structure, data types, conditional and sequential control statements, control structures, conditional control, sequential control, cursors, exception Handling, triggers, procedures and packages.

References

1. Fundamental of Database Systems by R. Elmasri; S. Navate; Benjamin Cummings.
2. Introduction to database systems by C. J .Date.
3. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan, Tata McGraw Hill.
4. Database Management Systems by Bipin Desai.
5. PL/SQL by Ivan Bayross.

PBCA404: Data Communication and Networking

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Overview, evolution of computer networks, Network architecture, configuring network, network strategies, networks types, LAN, MAN and WAN, Line configuration, topology, transmission mode, identify key components of network, categories of network, differentiating between LAN, MAN, WANS and Internet.

Unit-II

The OSI model, The physical layer (bandwidth limited signals, transmission media, wireless transmission), Multiplexing, Modulation, the data link layer, error detection and correction, data link protocols, the medium access sublayer, the channel allocation problem.

Unit-III

IEEE standard 802 for LANs and MANs, Switches, Bridges, Routers, The network layer routing algorithm, congestion control algorithm, the transport layer, the presentation layer, the session layer, the application layer.

Unit-IV

Introduction to TCP/IP Model, compare TCP/IP to (OSI) reference model, TCP/IP applications such as FTP, Telnet, DNS, DHCP, SNMP, SMTP, POP3 etc. Basic Mobile communication network Model, Wi-Fi network, Bluetooth, Broadband & Based Line Connection.

Reference Books

1. Andrew S. Tanenbaum, Computer Networks, Prentice Hall
2. Behrouz A forouzan, TCP/IP, Tata Mc Graw Hill Pub. Co.
3. DE Corner and DL Stevens, Internet working with TCP/IP Volume I-III, Prentice Hall of India.
4. Wright and Stevens, TCP/IP Illustrated, Pearson Education Asia.
5. Karanjit S. Siyan, Inside TCP/IP, Techmedia.
6. Minasi, Mastering LAN, BPB Publications.
7. Minoli, Internet, Interanct Engineering, Tata Mc Graw Hill Pub. Co. Ltd.

PBCA451: Data Structure Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA452: PHP Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

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PBCA453: PL/SQL Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

BCA –V Semester

PBCA501: Computer Graphics

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Introduction to Computer Graphics: Definition, Application areas of Computer graphics, Graphical user interface, Cathode ray tubes, Random scan displays, Raster scan displays, Color CRT monitors, Flat panel displays (Plasma Panels, Liquid crystal displays, Electroluminescent displays, etc.), Graphics software (GKS, PHIGS), Color Models (RGB, CMYK, HSV, Lookup tables, color map table, etc.)

Unit-II

Raster Graphics Algorithms: Line drawing algorithms (DDA, Bresenham's algorithm), Circle and Ellipse drawing algorithms, Filling (Scan-converting Polygon filling, Inside outside tests boundary fill, flood fill and area fill algorithm).

Transformations: 2-D transformations (Translation, Rotation, Reflection, shearing, scaling), Homogeneous coordinate representation, 3-D transformations.

Unit-III

Two dimensional Clipping and visible surface detection methods: Viewing pipeline, window and viewport, Sutherland-Cohen sub-division algorithm, Cyrus-beck algorithm, classification of visible surface detection algorithm, Backface algorithm, Depth sorting method, Area subdivision method etc.

Unit-IV

Introduction to Digital Image Processing: Definition, application areas. File forms, Basic digital Image processing techniques like antialiasing, Convolutions, Thresholding etc, Image enhancement.

Reference Books:

1. Hearn & Baker: Computer Graphics (2nd Ed.). Prentice Hall India.
2. Krihsnamurthy N: Introduction to computer Graphics, Tata Mc Graw Hill Edition.
3. Zhigang X. & Plastock R.a. : Theory and problems of Computer Graphics (Schaum's Outline), Tata Mc Graw Hill.
4. Gonzalez & gonzalez, Digital Image Processing, Pearson Education.
5. Jain V.K. Fundamentals of Digital Image processing, Pearson Education.

PBCA502: DotNET Technologies

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT I

Introduction to .NET: Concept and Features, Microsoft Intermediate Language, Meta Data, .net name spaces, Common Language Runtime, Common Type System, Common Language Specification, overview of .Net Applications.

UNIT II

Introduction to C# Programming with respect to ASP.NET. Basics of ASP. NET, Creating and deploying ASP .NET applications, Web forms, Web controls, working with events.

UNIT III

Rich web controls, Custom web controls, Validation controls, Debugging, Deploying projects with Business objects.

UNIT IV

Basics of ADO .NET , ADO Objects, (Data Table – Data Views – Data Set, Data Adapter), OLEDB and SQL Managed Providers.

Reference books:

1. Herbert Schildt, The Complete Reference C# 3.0, Tata McGraw-Hill
2. ASP.NET 4 Unleashed by Stephen Walther, Kevin Scott Hoffman, Sams Publishing
3. Bill Evjen, Professional ASP.NET 3.5 in C# and VB, Wrox Publication
4. Kogent Solutions, C# 2008 Programming covers. NET 3.5 (Black Book), Dreamtech Press

PBCA503: E-Commerce Application Development

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Introduction to E-Commerce: Definition of e-Commerce, objectives, advantages, disadvantages, scope of e-commerce, Traditional Commerce V/s E-Commerce.

Unit-II

E-Commerce Models and Frame work: Business to consumer, Business to Business, Consumer to Consumer, The Value Chain model, Supply Chain Management, Competitive advantage, Business strategy. Definition of EDI, Types of EDI, EDI standards, EDI Security and Privacy Issues, EDI Implementation, Format of EDI, Electronic-Catalogs, Digital Libraries.

E-Payment System: Types of Electronic Payment Systems, E-Cash, E- Cheque, Smart Cards, Credit Card, Debit Card, E-Purse, Payment Gateways.

Unit-III

Designing (Technical, Detailed, High Level): Introduction to Technical Design and Construction., Understanding Technical Design. Introduction to Detail Design. Introduction to High-Level Design, Understanding High-level Design, Performing High-Level Design, High Level design of Business transactions Applying High-Level design.

Unit-IV

Testing & Implementation: Introduction to Testing. Understanding Testing. Applying Testing. Challenges an Opportunities in Applying Verification and Validation.

Implementation : Understanding Implementation. Applying Implementation Planning. An Example of Applying Implementaiton Planning. Challenges and Opportunities Implementation Planning.

Reference Books:

1. Ecommerce : Devid Withlay TMH
2. Developing E-Commerce Systems by Jim A. Carter PHI.
3. E-Commerce new vistas for business by T.N. Chandra, R.K. Suri, Sanjiv Verma, Dhanpat Rai & Co.

PBCA504: Software Engineering

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Software Characteristics, Components, Applications, Software process Models : Waterfall, spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

Unit-II

S/W Project planning Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Model: COCOMO Model.

Unit-III

S/W Design: Objectives, Principles, Concepts, Design methodologies Data design, Architectural design, procedural design, Object oriented concepts.

Unit-IV

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing strategies: verification & validation, unit test, integration testing, validation, testing, system testing

Reference Books:

1. Roger, S. Pressman, "Software Engineering-A Practitioner's Approach", Third Edition, McGraw Hill
2. R.E. Fairley, 'Software Engineering Concepts', McGraw Hill
3. Jalota "An Integrated Approach to Software Engineering", Narosa Publishing House.

PBCA551: Graphics Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA552: DotNet Lab.

Exercises to be framed so as to cover the topics and tools covered in theory paper.

PBCA553: SRS Report Presentation

BCA –VI Semester

PBCA601: Management Information System

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach. Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Types of Information Systems.

Unit-II

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management. DSS: Definition and characteristics, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

Unit-III

Developing Information Systems: Analysis & Design of Information Systems, Implementation & Evaluation, Pitfalls in MIS Development.

Unit-IV

Functional MIS: A Study of Marketing, Personnel, Financial and production MIS.

Reference Books:

1. Gordon B. Davis & M.H. Olson. "Management Information Systems: Conceptual Foundation, structure & Development."
2. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management" PHI.
3. Lucas, "Analysis, Design & Implementation of Information System.

PBCA602: Network Security and Cryptology

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

UNIT I

Security threats, Security Services, Security Mechanisms, Network Security Model, Cryptography, Cryptology, Cryptosystem, Cryptoanalysis, Symmetric and Asymmetric Ciphers Schemes, Block Ciphers, Stream Ciphers, Steganography,

UNIT II

Data Encryption Standard (DES) Key recovery attacks on block ciphers, Iterated DES and DESX, Advanced encryption Standard (AES), Pseudorandom Functions, The birthday attack, Number-Theoretic Primitives, Fermat's and Euler's Theorem, RSA algorithm.

UNIT III

Symmetric Encryption Schemes, Substitution Techniques, Transposition Techniques, Asymmetric Encryption Schemes, Security of CTR modes, Security of CBC with a random IV, Hybrid encryption.

UNIT IV

Message Authentication, Hash Functions, Hash Algorithms, MD5 Message Digest, Secure Hash Algorithm, Digital Signatures, RSA based signatures, Authentication Protocols, Digital Signature Standard, Network Security Practice –Authentication Applications, Electronic Mail Security, IP Security, Web Security, System Security- Intruders, Malicious Software, Firewalls.

Reference Books:

1. Cryptographic & N/W security: Principles & Practices by Stalling, Prentice Hall.
2. Network Security Essentials: Applications & standards by Stalling, Pearson Education Asia, 2003.

PBCA603: Data Warehousing and Data Mining

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-I

Introduction to Data Warehouse, Data warehouse uses, Data Warehouse Planning stages and Designing approaches. Data Warehouse Delivery Methods.

Unit-II

System Processes; data in Flow Process, Extract and load process, Clean and transform Process, Backup and Archive process and Query Management Process. Process Architecture - Load manager, Warehouse manager, Query manager.

Database Schema-Star flake schema, Identifying facts and dimensions, Designing fact tables and dimension tables, Design Star flake schema, Multi-dimension schemas. Horizontal and vertical partitioning, Hardware partitioning.

Unit-III

Aggregations and summary table Data Marts, Designing Data Marts. Metadata-Data transformation Hardware architecture-Process, Server, Network and Client hardware Contents of data warehouse database, Database structures and layout and file systems.

Unit-IV

Data Mining: Data mining concepts, business, technical and social context for data mining, data mining interface, data mining approaches, data mining methodologies, data preprocessing: data cleaning, data reduction, data transformation, technologies used for data mining.

Reference Books:

1. Sam Anahory, Dennis Murray, "Data Warehousing", Pearson Education pub.
2. Michel A. Berry, Gordon S. Linoff, "Mastering Data Mining", Wiley Publishing.
3. Mallach G, Fredn E, "Decision Support System and Data Warehouse Sustems", TMH
4. Data mining concepts & techniques : jia wei han, micheline kamer, jian pei
5. John Poole, Dan Chang, Dauglas Talbert, "Common Warehouse Metadata Developer's Guide", Wiley pub.

PBCA604 (Elective Paper): Artificial Intelligence and Expert Systems

Max Marks: 100 (ESE: 70 CIA: 30)

Passing marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit – I

Concept of intelligence, Artificial intelligence, definition turning test, areas of application. Search techniques, state space, Production rules, problem characteristics. Production system characteristic, depth first, breadth first search methods.

Unit – II

Heuristic search method, generate and test, hill climbing, best first method, graph search, AND OR search methods, constraint satisfaction, backtracking. Introduction to list and string processing, concept of knowledge, Logic, propositional and predicate calculus, resolution.

Unit – III

Semantics nets, frames, conceptual dependency, scripts, Monotonic reasoning, logical reasoning induction, default reasoning, minimalist reasoning, statistical reasoning, Baye's theorem, certainty factors, Dempster Shafer theory, Fuzzy logic.

Unit – IV

Concept of learning, Knowledge acquisition, rote learning, discovery, analogy.

Concept of expert system, need for an expert system, Component and categories of an expert system, Stages in the development of an expert system.

Recommended Books

1. Elaine Rich & Kevin Knight: Artificial Intelligence and Expert System, PHI.
2. Charniak, E.: Introduction of Artificial Intelligence, Narosa Publishing House.
3. Winton. P.H. : LISP, Narosa Publishing House.
4. Marcellus: Expert System Programming in TURBO PROLOG Prentice-Hall Inc. 1989.
5. Clark, K. L. & McCabe, F.G.: Micro-Prolog Prentice-Hall Inc. 1987.

PBCA605 (Elective Paper): Animation and Multimedia

Max Marks: 100 (ESE: 70 CIA: 30)

Passing Marks:40

Question Paper pattern for End Semester Exam (ESE)

Max Marks: 70

Part-A will contain 12 (student will attempt any 10) very short questions of 1 mark each.

Part-B will contain 4 questions (1 from each unit) of 5 marks.

Part-C will contain 4 questions (1 from each unit with internal choice) of 10 marks.

Unit-1

Introduction to Multimedia Systems: History of Multimedia Systems, What is Multimedia? Challenges for Multimedia Systems, Desirable Features for a Multimedia System, Components of a Multimedia System, Applications, Trends in Multimedia.

Multimedia Systems and Applications: Categorization of Multimedia, Major Characteristics of Multimedia, Terminology, Usage.

Unit-2

Computer Animation: Introduction, Early Animation Techniques, Types of Animation, Software for Animation, Difference Between Traditional Animation and Computer Animation

Flash: Bitmap Vs vector graphics, Image Vs Movie ,Conventional Animation Vs Flash, animations, Concepts of Frame Rate and Resolution, Exploring The Flash Interface ,The Flash stage ,Stage Settings ,Creating a new Flash file ,The various import formats, Timeline- Play head/Frames/Key Frames/ Blank frames ,Menus, Toolbox and Properties, Color Swatches and Color Mixer ,Rulers, Guides, Grids.

Unit-3

Basic drawing and Selections ,Applying the Pencil and Eraser tools ,Drawing with the Pen tool ,Creating custom line styles ,Selection Tools -Arrow Tools, and Lasso Tool ,Navigation Tools - Hand and Zoom Tools.

Shapes : Basic shapes ,Creating rectangles, ovals, and circles, polystar ,Creating freeform shapes ,Selecting and editing shapes ,Using the Selection and Lasso tools ,Transforming shapes ,Copying, moving, and deleting a shape ,Grouping and aligning objects ,Color ,Applying color ,Using the Paint Bucket and Ink Bottle tools ,Using the Eyedropper and Brush tools ,Fill Transform Tool ,Custom colors and gradients ,Creating a custom color swatch ,Applying gradients ,Creating a custom gradient Layers :Layer basics ,Merging and rearranging layers ,Deleting a layer ,Modifying layers ,Renaming a layer ,Layers Folders ,Locking and hiding layers ,Masking a layer , Guide layers, Creating a guide layer ,Controlling the speed of a motion tween ,Arranging and extending frames Scenes and Frame Labels: Creating a Scenes ,Organizing Scenes ,Creating Frame Labels ,Symbols and Instances, Creating and editing a button symbol ,Controlling tints, brightness and transparency of instances

Unit-4

Animation concept: Creating basic animation frame by frame, Creating animation using onion skin Shape animation, Understanding and creating symbols for animation, Motion tween animation, Using rotate, alpha effects in animation, Motion guide animaton.

Working with colors palletete, Adding sound to animation, Adding sound to buttons, Importing images from other software's, Creating effective web banners.

Reference Books:

1. Multimedia Applications: Darshan singh Berwal ,Vayu Publications.
2. The Complete reference: TMH.
3. Macromedia Flash Professional 8 unleashed: Vogeller, Pearson.

PBCA651: Project

Two typed and duly bound copies of project report shall be submitted at least 3 weeks before commencement of the Theory/Practical examination which ever commences earlier.

Guidelines:

- It is a team work – team consisting of preferably two (in no case more than three) students. In special cases, a single student team is acceptable.
- Each team will be allotted a faculty member who will be their mentor.
- The topic will be allotted by the mentor at the beginning of the course.
- There will be three monthly presentations of 20 min. each and one ESE presentation of 40 minutes.
- It is advisable that the finalization of topic and major milestones is completed within 20 days from the date of start of the semester.
- The mentors will assess the progress of the students allocated to them on ongoing basis.