S. S. Jain Subodh P.G. (Autonomous) College

(Department of Computer Science)

Bachelor of Computer Applications (BCA)

Three Year (Six Semester) Course

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**.

Eligibility for admission:

Admission procedure for I semester starts in the month of June/July every year. The admission of the BCA course should be made irrespective of the stream (Arts/Science/Commerce) a candidate must have passed 10+2 level exam of any board with 50% or more (45% for SC/ST/ OBC/SOBC category) in aggregate without any approximation.

 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 (1from each unit) each carrying 5 marks, all are compulsory.

c) Part C, will contain 4 long descriptive types of questions (1from 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.

Examination Scheme

Particular	No. of questions	Marks of each question	Total Marks
Part A	12 Very Short Questions (attempt any 10 questions)	10 X 1	**10**
	4 Short Question from each Unit (Compulsory)	4 X 5	**20**
Part B	4 Questions from each Unit with Internal Choice	4 X 10	**40**
Total			**70**

Passing Criteria: Rules and Regulations for promotion of students to higher classes and matters related to examinations

• Promotion from odd semesters to even semesters is automatic, provided the student has registered his / her name for the examination by paying the required examination fee.

• To gain eligibility for promotion to the next year (III / V Sem.), a student is required to pass in at least 60% of the subjects offered in the previous year's semesters put together.

• A student is required to score a minimum of 40% in a subject (theory and internal assessment put together). However, he/she has to score a minimum of 40% in theory. In the case of subjects with practical it is mandatory for the student to score 40% in the practical examination to be declared to have passed in that subject. If the student fails in theory or practical, he/she should reappear for theory or practical examination as the case may be. Examinations will be conducted for odd and even semesters at the end of each semester. There is no provision of Supplementary examinations in Semester Scheme courses.

• If student does not secure minimum marks in theory paper but clears the practical exam of that paper then practical marks will be carried forward.

• Students have to appear in both the internal exams of each semester. There will be no provision of repeat internal examinations under any circumstances.

• Candidate must complete the course within the double of the course duration time after appearing in the main exam. Candidate will be allowed to appear 3 times (1 Main + 2 extra attempts) in that particular paper.

• Candidate taking admission in Autonomous course will not be allowed to simultaneously pursue any other regular course from any other university and they will also not be allowed to do any full time job.

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

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

Number of Units in Syllabus

S. No.	Stream	No. of Units
1	BCA	4

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

S. No.	Stream	Semester	Number of Papers per Semester		Total Marks of I Semester	Sub Total	Grand Total
			Theory	Practical			
1	BCA	I, II, III, IV and V Semester	4 X 100	4 X 100	400 + 300=700	700 X 5=3500	3500
		VI Semester Project	4 X 100	4 X 100	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%	II	C
40.01-48.0%	Pass	D
Less than 40%	Repeat / Fail	E

Scheme of Examinations & Syllabus
w. e. f. session 2022-23

Semester I

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)			
			Max.	Min.	Max.	Min.	Theory		Practical	
PBCA101	Computer Organization	4	70	28	30	12	3		-	
PBCA102	Programming in C	4	70	28	30	12	3		-	
PBCA103	Language and Communication	4	70	28	30	12	3		-	
PBCA104	Elementary Physics and Digital Electronics	4	70	28	30	12	3		-	
PBCA151	Office Management Lab.	4	60	24	40	16	-			4
PBCA152	Programming in C Lab.	4	60	24	40	16	-			4
PBCA153	Communication Skills Lab.	4	60	24	40	16	-			4

Semester II

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)			
			Max.	Min.	Max.	Min.	Theory		Practical	
PBCA201	Object Oriented Programming through C++	4	70	28	30	12	3		-	
PBCA202	Internet & Web Technologies	4	70	28	30	12	3		-	
PBCA203	Desktop Publishing (DTP)	4	70	28	30	12	3		-	
PBCA204	Discrete Mathematics	4	70	28	30	12	3		-	
PBCA251	C++ Lab.	4	60	24	40	16	-		4	
PBCA252	Internet & Web Lab.	4	60	24	40	16	-		4	
PBCA253	Desktop Publishing Lab.	4	60	24	40	16	-		4	

Semester III

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)	
			Max.	Min.	Max.	Min.	Theory	Practical
PBCA301	Database Management System	4	70	28	30	12	3	-
PBCA302	Programming in Java	4	70	28	30	12	3	-
PBCA303	Data Structure & Algorithms	4	70	28	30	12	3	-
PBCA304	System Analysis & Design	4	70	28	30	12	3	-
PBCA351	DBMS Lab.	4	60	24	40	16	-	4
PBCA352	Java Lab.	4	60	24	40	16	-	4
PBCA353	Data Structure & Algorithms Lab.	4	60	24	40	16	-	4

Semester IV

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)	
			Max.	Min.	Max.	Min.	Theory	Practical
PBCA401	Operating System	4	70	28	30	12	3	-
PBCA402	PHP Programming	4	70	28	30	12	3	-
PBCA403	Advance Database Concepts	4	70	28	30	12	3	-
PBCA404	Data Communication and Networking	4	70	28	30	12	3	-
PBCA451	Linux Lab.	4	60	24	40	16	-	4
PBCA452	PHP Lab.	4	60	24	40	16	-	4
PBCA453	PL/SQL Lab.	4	60	24	40	16	-	4

Semester V

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)	
			Max.	Min.	Max.	Min.	Theory	Practical
PBCA501	Computer Graphics	4	70	28	30	12	3	-
PBCA502	Dot Net Technologies	4	70	28	30	12	3	-
PBCA503	Programming in Python	4	70	28	30	12	3	-
PBCA504	Software Engineering	4	70	28	30	12	3	-
PBCA551	Computer Graphics Lab.	4	60	24	40	16	-	4
PBCA552	Dot Net Lab.	4	60	24	40	16	-	4
PBCA553	Python Lab.	4	60	24	40	16	-	4

Semester VI

Paper Code	Nomenclature of the Paper	No. of Hours per Week	External Marks		Internal Marks		End Sem. Exam (in Hours)	
			Max.	Min.	Max.	Min.	Theory	Practical
PBCA601	E-Commerce Application Development	4	70	28	30	12	3	-
PBCA602	Cyber Security	4	70	28	30	12	3	-
PBCA603	Data Warehousing and Data Mining	4	70	28	30	12	3	-
	Elective Papers							
PBCA604-A	Artificial Intelligence and Expert Systems	4	70	28	30	12	3	-
PBCA604-B	Animation and Multimedia	4	70	28	30	12	3	-
PBCA651	Project	12	200	80	100	40	-	4

BCA - I Semester

PBCA101: Computer Organization

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 very short questions of 1 mark each (attempt any 10).
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, generation of computers, classification of computers, applications of computers. Input and Output Devices: Keyboard, pointing devices, digital camera, scanners. Output devices- printers, plotters, monitors, projectors Computer System: Central processing unit (CPU).

UNIT-II
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, Computer Software: Software definition, relationship between software and hardware, software categories, system software, application software. Introduction of operating system.

UNIT-III
CPU Design: Timing and control, Instruction cycle, Memory Reference Instructions, Input-output and interrupt, complete computer description, 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.

Reference Books:
1. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi.
2. Computer Fundamentals by P.K. Sinha; BPB Publication, New Delhi 8
3. Mano Morris, Computer system architecture, PHI, New Delhi.
4. Mano Morris, M. Digital Design, PHI, New Delhi.
5. Jain R. P., Modern Digital Electronics, Tata Mc Graw Hill , New Delhi.

PBCA102: 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 very short questions of 1 mark each (attempt any 10).
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, Algorithm, Flowchart, History and importance of C, Basic Structure and Execution of C Program, Constants, Variables, and Data Types, Qualifiers, Operators and Expressions, Operator Precedence and Associativity, Managing Input and Output Operations, Decision making and Branching: if statement, if…else statement, nesting of if else statement, else if ladder, switch statement, Goto statement.

UNIT-II
Iteration: while, do…while, for loop, Nested loops, break & continue.
Arrays and Strings: One-dimensional arrays, Declaration and Initialization, Two-dimensional arrays, Declaration and Initialization, Character arrays.
String: Reading and Writing strings, String-handling functions – strlen, strcpy, strcat, strcmp.

UNIT-III
Functions: Need, Elements of user-defined functions, Definition of Functions, Function call and declaration, Category of Functions, Parameter Passing, Recursion, Passing arrays to functions, Passing strings to functions.
Storage Classes: 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, Array through pointers.

UNIT-IV
Structures and Unions: Defining structure, Declaring structure variables, Accessing structure members, Structure initialization, Operation on individual members, Array of structures, Union.
File Management in C: Introduction of File handling, Need of File Handling, Defining, Opening and Closing a File, Input/Output Operations on Files.

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).

PBCA103: Language and Communication

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 very short questions of 1 mark each (attempt any 10).
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 (Language Skills)
- Speaking Skills (Pronunciation and intonation)
- Listening Skills (Process and Types of Listening, Listening Comprehension)

UNIT-II (Grammar)
- Basic Sentence structure, Determiners
- Tenses, Active and Passive Voice, Direct and Indirect Speech

UNIT-III (Presentation Skills and Oral Communication)
- Importance of Presentation, Types, Distribution of Time
- Visual Presentation, Seminars & Conferences
- Role and Types of Oral Communication
- Extempore, Debate, Speeches, Conversation Practices, Group Discussion, Expressing Opinion

UNIT-IV (Composition Skills)
- Precis, Report Writing, Note making, Letter Writing
- Resume, C.V., Cover Letter
- Emails, Blog Writing, Content Writing

Reference Books:
1. Essential English by E Suresh Kumar,P Sreehari ,J Savithri , Orient Black Swan
2. Communication by C.S. Rayudu, Himalaya Pub. House
3. Communication Skills and Report Writing by Prof.K.Mohan,Tata McGraw Hill
4. Business Communication Today by Boyce and Hull,Tata McGraw Hill

PBCA104: Elementary Physics and Digital Electronics

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 very short questions of 1 mark each (attempt any 10).
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 Field: Electric Charge, Coulomb's Law, Quantization and Conservation of Electric Charge, Electric Field and Gauss' Law of Electrostatics, Electric Potential & Energy and Electrical Power, Electric Current, Resistance, Ohm's Law, Resistivity & Specific Resistance, Series and Parallel Combination of Resistances, Capacitance, Combination of capacitance in Series and Parallel, Electromotive Force, Current in A Single Loop, Kirchoff"s Current Law, Kirchoff's Voltage Law.

UNIT-II
Magnetic Field: Magnetic Field due to a Bar Magnet, Biot Savart's Law, Magnetic Field Due to a Current Carrying in Straight Wire and Coil, Force Between Two Parallel Currents, Magnetic Field Inside Solenoid and Toroid, Magnetic Flux, Faraday's Law of Electromagnetic Induction, Inductance, Energy Stored in an Inductor and Capacitor, Resonance Condition in Series LCR Circuit.

UNIT-III
Logic Family: Introduction to Logic and Implementation with Logic Gates, Boolean Algebra, Positive and Negative Logic, Logic Functions and Truth Tables -NOT, AND, OR NOR, NAND & EX-NOR, NAND and NOR Gates as Universal Gates, De Morgan's Theorems, Standard Forms for Logical Expressions: Sum of Products(SOP) and Product of Sums(POS), Specification of Logical Functions in Terms of Minterms and Maxterms, Karnaugh Maps, Introduction of "Don't Care" States,

UNIT–IV
Combinational Circuits: Adder and Subtractor, 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.
Sequential Circuits: Latches, RS Flip Flop, D Flip Flop, J-K Flip Flop, T Flip Flop, Master-Salve Flip Flop, Registers and Synchronous & Asynchronous Counters.

Reference Books:
1. Bernard Grob: Basic Electronics, Tata McGraw Hill.
2. Fowler: Electricity, Tata McGraw Hill.
3. Shivakumar, Engineering Physics, Tata McGraw Hill.
4. lyer, Circuit Theory, Tata McGraw Hill. 9 a

5. R.P. Jain, Modern Digital Electronics, Mc Graw Hill, India.
6. S. Salivahanan & S Arivazhagan, Digital Circuits and design, Mc Graw Hill , India.
7. Millman J. & Christos, Integrated Electronics, McGraw Hill Book Company, New Delhi.
8. Albert Paul Malvino and Donald P. Leach, Digital Principles and Applications, (Fourth Edition) Tata Graw Hill Publishing Company Ltd, New Delhi.
9. Adel S. Se&a, and Kanneth C. Smith, Microelectronic Circuits, Oxford University Press. 15

PBCA151: 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.

PBCA152: Programming in C Lab.

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

PBCA153: Communication Skills Lab

Phonetics: Practice of Sounds and Pronunciation and Conversation Practice

Mock Interview

Group Discussion and Presentation

Role Play and Situational Talks

BCA – II Semester

PBCA201: Object Oriented Programming through 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 very short questions of 1 mark each (attempt any 10).
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
Object Oriented Concepts: Evolution of OOP, OOP Paradigm, Advantages of OOP, Functional Programming v/s OOP approach, Characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading.
Introduction to C++: C++ Tokens, Data Types, Operators, Type Conversion, Variable Declaration, Reference Variables, Arrays, Statements, Expressions, Conditional Statements, Jumping Statements, Loops, Functions, Inline Function, Pointers, Structures.

UNIT-II
Classes and Objects: Classes, Objects, Defining Member Functions, Array of Class Objects, Pointers and Classes, Passing Objects, Constructors, Types of Constructors, Destructors, this Pointer, Access Specifiers, Friend Functions, Static Member of Class.

UNIT-III
Inheritance: Introduction, Importance of Inheritance, Types of 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
Generic Programming Using Templates - Need & Importance of Templates, Function Template and Class Template
Exception Handling – Need of Exception Handling, Throw, Try, Catch Block

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.

PBCA202: Internet and Web 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 very short questions of 1 mark each (attempt any 10).
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, a brief overview of TCP/IP and its services, web server, web client, domain registration. Introduction to 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, IFrame, DIV and Layer Tags. Understanding XML: SGML, XML, XML and HTML.

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: Desktop Publishing (DTP)

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 very short questions of 1 mark each (attempt any 10).
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

Page Maker: Creating a New Document, Setting the Page Setup, Page Numbers, Page size view, Rulers Measurement System, Using Guidelines to Master Pages, Aligning to Guidelines and Locking Guidelines. Entering Text: Changing the font Families, font size, Changing Character Specifications, Changing type leading, character width, and tracking. Saving document in different formats, Formatting Paragraph: Changing Indents, Space around paragraph, Paragraph Alignment. Creating a Frame: Converting other objects to Frames, Indents and Tabs Setting, Page Maker Adding Shapes Changing lines and fill specifications, Changing Round Corner, Creating Header & Footer Defining Style, Developing a long Document: Using Story Editor, Switch between story editor and layout editor, Checking spelling, Using find feature, Color palette, Adding color to text, Defining custom colors.

UNIT-II

Introduction to Photoshop, Creating a New File: Main Selections, Picking color, Painting with paintbrush tool, using the magic wand tool and applying a filter, Color Mode (Gray Scale, RGB, CMYK, Bitmap), Changing Foreground and Background colors, Large color selection Boxes and small color swathes, Eyedropper tool, Brush Shape, Drawing a vertical and Horizontal Straight lines with any brush, Creating a new brush and Custom Brushes, Pencil Options. Rubber Stamp Options: Rubber stamps an Aligned Clone, Rubber Stamping, Impressionist Style, Using line tool. Using the Editing Tool: The Smudge Tool, the Blur and Sharpen Tool.

UNIT-III

The Dodge / Burn Tool, Selection Tools: Making Rectangular and Square Selections, Feathering a Selections, Lasso Features, Lasso Options, Magic Wand tool, Moving an anchor point or Direction point to change the shape of curve, Adding and Removing Anchor points. Introduction of layers: Creating & editing new layers, adding a background. paint bucket tools, Applying Filters: Blur Filters, Sharpen Filters, Sketch Filters, Texture Filters, Other Special Filters Printing your document, Coral draw Introduction to coral draw, use and importance in designing, various graphic file and file extension, vector and raster images, introduction to screen and work area. Introduction to tool of coral draw, managing palettes, working with images, patterns and textures, working with shapes, colors and fills, image rasterization and editing, transformation menu.

UNIT-IV

Coral draw files and supporting documents, import and export of files and file formats, Page setup and designing, using styles and templates, working with text, formatting text, text

attributes. Designing different page layouts, column layout, working with layers, special effect to objects and texts, contour tool, Preparation of visiting card and invitation cards, Shaping Dockers and logo design, introduction brochure and books

Reference Books:

1. Complete Reference of Page Maker- Tata McGraw Hill
2. DTP Publishing Mint Page Maker – Springer Pubication.
3. Photoshop in Easy Steps- Tata McGraw Hill
4. Coral Draw an Official Guide- Tata McGraw Hill
5. Cavgage Learning- Bring it Home with Coral Draw
6. Coral Draw in Simple Steps- Wiley Publication

PBCA204: Discrete Mathematics

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 very short questions of 1 mark each (attempt any 10).
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
Sets, Fundamental operations of sets, Principle of Inclusion and Exclusion, Principle of mathematical Induction, Relations and Functions, Equivalence Relation and Partitions.

UNIT-II
Proposition, Conjunction, Disjunction, Negation, Conditional and Bi-conditional statements, Compound proposition, Truth tables, Tautologies and Contradictions, Logical equivalence, De Morgan's law, Quantifiers, Valid arguments, Rules of Inference.

UNIT–III
Permutations and Combinations, Pigeon Hole Principle and its Applications, Types of Graphs, Walk, Paths and Circuits, Eulerian and Hamiltonian graphs, Shortest Path Algorithms, Isomorphism of graphs, Planar graphs.

UNIT-IV
Matrix representation of Graphs, Adjacency Matrices, Incidences Matrices, Trees, Characterization of trees, Spanning trees, Breadth First Search and Depth First Search Method, Minimal Spanning Trees.

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. 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

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.

PBCA253: Desktop Publishing Lab.

Exercises to be framed so as to cover the topics and tools covered in 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 very short questions of 1 mark each (attempt any 10).
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 of DBMS, Basic DBMS Terminology, DBMS Architecture, Database System v/s File System, Data Independence. Schemas, Instances, Database Languages – DDL, DML, DCL, TCL. Database Administrator, Data Models - Hierarchical Model, Network Model, Entity-Relationship Model, Relational Model, Object-Oriented Model.

UNIT-II
Entity Relationship Model: ER model concepts, Notation for ER diagram, Mapping Constraints, Generalization, Specialization, Aggregation.
Relational Model: Introduction to the Relational Model.
Keys - Primary Key, Super Key, Candidate Key, Alternate Key, Composite Key, Foreign Key.
Constraints – Types of Constraints
Relational Algebra: Fundamental operations of Relational Algebra & their Implementation –
Select, Project, Rename, Set Operations, Division, Joins.

UNIT-III
Functional Dependencies, Normalization – 1NF, 2NF, 3NF, BCNF, Loss Less Decomposition, Dependency Preservation.
Transaction Management – Transaction Concept, Transaction States, ACID Properties.

UNIT-IV
SQL: Basics of SQL, SQL Data Types and Literals, SQL Operators, Types of SQL Commands, Tables, Indexes, Views, Aggregate Functions, Select Statement, Subqueries, Insert, Update and Delete Operations, Joins, Unions, Intersection.

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.

PBCA302: Programming in Java

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 very short questions of 1 mark each (attempt any 10).
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: Object Oriented Concepts, Introduction to Java, Features of Java features, Java virtual machine.
Programming Fundamentals of Java: Java Tokens, Operators, Data types, Control Structures, Array

UNIT-II
Classes and Objects: Object References, Method Overloading, Constructors, Constructor Overloading, Inheritance. Static, Final, Abstract Keywords
Packages and Interfaces: Access Specifiers, Package Creation, Use of packages, Basics of Interfaces, Use of Interfaces
String Handling: String Class, String methods.

UNIT-III
Exception handling in Java: Exception classes, Exception raising & handling, use of Try, Catch and finally, Throwing Exceptions, User Defined Exceptions.
Applets: Introduction to Applets, Applet life cycle, Creating Applets, AppletViewer
Graphics: Graphics Components, Color, Font, Drawing Objects

UNIT-IV
Threading in Java: Concepts of Multi-threading, Thread Life Cycle, Thread class, Runnable Interface, Thread Management in Java
JDBC: JDBC Drivers, Two Tier and Three Tier client server Architecture, Setting up a connection to database, Creating and executing SQL statements

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. Balaguruswmy, Programming with Java, Tata McGraw Hill.
4. Zukowski: Mastering Java 2, BPB Publications.
5. Herbert Scliildt, Java 2, Tata Mc Graw Hill.

PBCA303: 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 very short questions of 1 mark each (attempt any 10).
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, Types of Data Structures, Algorithm, Pseudocode, Characteristics of Algorithms, Algorithm Analysis, Algorithm Complexity – Space Complexity, Time Complexity, Abstract Data Types.
String Processing – Basic Terminology, Storing Strings, String Operations, Pattern Matching Algorithms.
Arrays: Representation in Memory, Operations - Insertion, Deletion, Searching – Linear Search, Binary Search, Sorting – Bubble Sort, Multidimensional Arrays, Pointers, Pointer Arrays.

UNIT-II

Sorting: Internal and External Sorting Techniques, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort, Radix Sort.
Linked lists: Linked List Vs. Arrays, Representation in Memory, Types of linked List - Singly Linked list, Doubly Linked list, Circular Linked list, Doubly Circular Linked list., Operations on Singly Link List – Insertion, Deletion, Traverse, Searching.

UNIT-III

Stacks: Array and Linked List representation of Stacks, Operations – Insertion, Deletion, Traverse, Application of Stack – Recursion, Polish Notation.
Queues: Array and linked list representation in Memory, Type of Queues – Simple Queue, Circular Queue, Priority Queue, Double Ended Queue. Operations on Simple and Circular Queue – Insertion, Deletion, Traverse. Applications of Queues.

UNIT-IV

Trees: Basic Tree Concepts, Representation of Binary Tree in memory, Binary Tree Traversals, Binary Search Trees, Heapsort.
Graphs: Representations, sequential representation, Warshall's Algorithm, Linked Representation of graphs, Operations on Graph, Traversing Graph.

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.

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 very short questions of 1 mark each (attempt any 10).
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, 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.

UNIT-II

Feasibility Study: Types of feasibility, Steps in Feasibility Analysis, Systems Analyst. 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, 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, White box & Black box testing strategies, verification & validation, integration testing. Implementation Planning and Conversion techniques.
Input/Output and Forms Design: Input Design, Output Design, and form Design. H/W and S/W Selection, Make V/s Buy decision and Maintenance, Documentation, Types of documentation, Security management disaster planning.

Reference Books:

1. Igor Hawryszkiewyez, Introduction to System Analysis and Design, 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentey,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.

PBCA351: DBMS Lab.

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

PBCA352: Java Lab.

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

PBCA353: Data Structure & Algorithms Lab.

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

BCA - IV Semester

PBCA401: Operating 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 very short questions of 1 mark each (attempt any 10).
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: Characteristics of Operating System, Evolution of Operating System, Types of Operating System, Functions of Operating System, Concept of Systems Calls.
Process Management: Process concept, process, process state, Process Control Block, Context Switching, CPU scheduling: Types of Schedulers, Scheduling Criteria, Scheduling algorithms.
Critical Section Problem, Semaphores and Inter Process Communication.

UNIT-II
Memory management: Logical and Physical Address Space, Swapping, Contiguous Allocation, multiple Partitions, Fragmentation Compaction, Paging.
Virtual memory management- Demand Paging, Page Replacement Algorithms-FIFO, LRU, Optimal Page Replacement.

UNIT-III
Deadlock: Deadlock Problem, Characterization, Prevention, Avoidance Detection and Recovery from Deadlock
File-System: File concept, Access Methods, Directory Structure, Protection, File-System Structure. Directory Implementation, Allocation Methods, Free-Space Management.

UNIT-IV
Introduction to Linux Operating System: Introduction, Basic Utilities, Working with files, Shells in Linux, Types of Shells in Linux, Introduction to Shell Programming, Editors in Linux, Introduction to Vim editor

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.
6.   Mark G. Sobell: A Practical Guide to Linux, Addison Wesley
7.   William Shotts: The Linux Command Line-A Complete Introduction, No Starch Press

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 very short questions of 1 mark each (attempt any 10).
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
Programming Fundamentals of PHP: Basic Syntax, Variables and constants, Data types, Operators and Expressions
Control Statements: Conditional Statements, Looping Statements (while, do…while, for loop, foreach), Nested Loops, Jumping Statement*.*

UNIT-II
Arrays: Numeric, Associative and Multidimensional Arrays
Functions: Defining a Function, Calling a Function, Parameter passing, Returning value from function
Strings: Creating and Accessing Strings, String Related Library functions, Searching, Replacing, Formatting, Pattern matching

UNIT-III
Form Data Handling: $_GET, $_POST, $_REQUEST Variables
Cookies: Introduction to Cookies, Need of Cookies, Setting up a Cookie, Deleting a Cookie
Session Management: Introduction to Session Management, Creating Session Variables, Retrieving Session Variables
Exception Handling: Understanding Exceptions and errors, Handling Exceptions in PHP, User Defined Exceptions

UNIT-IV
File Handling: Opening and Closing a file, Coping, Renaming and Deleting a file, File opening Modes, Reading and Writing in Files
Database Handling: Connection with MySql Database, Performing basic database Operations (Insert, Delete, Update, Select), Query Handling.

Reference Books:
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 very short questions of 1 mark each (attempt any 10).
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, ACID Properties, Storage Structure, Concurrent Executions, Serializability - Conflict Serializability and View Serializability, Recoverability.

Concurrency Control: Lock-based Protocols - Modes of Locks, Granting of Locks and The Two-Phase Locking Protocol, Time Stamp Based Protocols - The Timestamp-Ordering Protocol and Thomas' Write Rule, Validation based Protocols, Deadlock Handling - Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

UNIT–II

Database System Architectures: Centralized and Client-Server Architecture, Server System Architecture- Transaction Server Process Structure and Data Servers.

Parallel Systems- Speed up and Scale up, Interconnection Networks - Bus, Mesh, Hypercube. Parallel Database Architectures - Shared memory, Shared disk, Shared nothing, Hierarchical. Distributed Systems.

UNIT-III

Distributed Databases: Distributed Data Storage, Distributed Transactions, Commit Protocol-Two-Phase Commit and Three-Phase Commit, Concurrency Control in Distributed Databases-Single Lock-Manager Approach and Distributed Lock Manager.

Parallel Databases: I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism- Parallel Sort and Parallel Join, Interoperation Parallelism- Pipelined Parallelism and Independent Parallelism.

UNIT-IV

PL/SQL – Introduction, Advantages, Blocks, Character Set, Literals, Data Types, Variables, Constants, Attributes, Control Structure – Conditional, Iterative and Sequential Control, Cursors, Exception Handling, Triggers, Procedures, Packages.

Reference Books:
1. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan, Tata McGraw Hill.
2. Fundamental of Database Systems by R. Elmasri; S. Navate; Benjamin Cummings.
3. Introduction to database systems by C. J .Date.
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 very short questions of 1 mark each (attempt any 10).
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, 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: Linux 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.

PBCA453: PL/SQL Lab.

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

BCA – V Semester

Paper 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 very short questions of 1 mark each (attempt any 10).
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), Color Lookup table.

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 Line Clipping algorithm, Cyrus-beck algorithm, classification of visible surface detection algorithm, Backface algorithm, Depth sorting method, Area subdivision method.

UNIT-IV
Introduction to Digital Image Processing: Definition, application areas. File forms, Basic digital Image Processing Techniques-Antialiasing, Convolutions, Thresholding, 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. Kuchhal M.C., Business Laws, Sultan Chand & Co., New Delhi.

Paper PBCA502: Dot NET 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 very short questions of 1 mark each (attempt any 10).
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: Programming in Python

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 very short questions of 1 mark each (attempt any 10).
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 and Overview: Comments, Keywords and Identifiers, Variables and Assignment statements, Standard Types, Other Built-in Types, Internal Types, Operators, Built-in Functions. Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Sequences: Strings, Sequences, Strings, String-only Operators, String Built-in Methods, Special Features of Strings, Conditionals and Loops: if statement, else Statement, elif Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement.

UNIT-II
Lists and Dictionaries: Functions, Lists, List type built in Methods, Special Features of Lists, Tuples, Tuple Operators and Built-in Functions, Special Features of Tuples, Introduction to Dictionaries, Built-in Functions, Built-in Methods, Dictionary Keys, Sets, Comparing Sets, Mathematical set operations, Set comprehensions.
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UNIT-III
Regular Expression and Exception Handling: Introduction, Special Symbols and Characters for REs, REs and Python, Exceptions in Python, Detecting and Handling Exceptions, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions.

UNIT-IV
OOPs in Python: Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods, Class variables, Inheritance, Polymorphism, Type Identification.

Reference Books:
1. Marrtin C Brown,"Python-The Complete Reference" McGraw Hill
2. Dr. R Nageshwara Rao ""Core Python Programming" Dreamtech Press India Pvt. Ltd
3. Reema Thareja "Python Programming: Using Problem Solving Approach"
4. Kanetkar Yashavant "Let Us Python" BPB Publications

Paper 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 very short questions of 1 mark each (attempt any 10).
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 Engineering, 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 testing, 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: Computer Graphics Lab.

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

PBCA552: Dot Net Lab.

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

PBCA553   Python Lab.

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

BCA – VI Semester

Paper PBCA601: 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 very short questions of 1 mark each (attempt any 10).
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: Business to consumer, Business to Business, Consumer to Consumer, Other models-Brokerage Model, Aggregator Model, Info-Mediary Model, Community model, Value chain model, Supply Chain Model. Competitive advantage, Business strategy.

UNIT-III
EDI: Definition of EDI, Types of EDI, EDI standards, EDI Security and Privacy Issues, EDI Implementation, Format of EDI, Electronic-Catalogs, Digital Libraries. E-Governance, E-Buying, E-Selling, E-Banking, E-Retailing.

UNIT-IV
E-Payment System: Types of E-Payment Systems (EFT, E-Cash, ECheque, Credit/Debit Card, Smart Card, Digital Tokens and Electronic Purses/ Wallets) Payment Gateways.

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.

Paper PBCA602: Cyber Security

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 very short questions of 1 mark each (attempt any 10).
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
Cyber Security: definition, cybercrime and information security, cybercriminals, classification of cybercrime, cybercrime Era. Cyber offences: categories of cybercrime, how criminals plan the attack, cyberstalking, cybercafe and cybercrime, botnets and cybercrime, Cloud Computing and cybercrime.

UNIT-II
Tools and methods used in cybercrime: phishing and Identity theft; methods of phishing, spear phishing, types of phishing scams, phishing toolkits, and spy phishing, Personally Identifiable Information, types and techniques of ID theft, password cracking, keyloggers and spywares, backdoors, steganography, DoS and DoS attacks, SQL Injection, Buffer Overflow.

UNIT-III
Cybercrime on mobile and wireless devices: Security challenges posed by mobile devices, attacks on wireless networks, credit card frauds mobile and wireless era. Authentication security service, attacks on mobile phones; mobile phone theft, mobile virus, mishing, vishing, smishing, hacking Bluetooth.

UNIT-IV
Cybercrime and Cyber Security: Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management, Anti-Cybercrime Strategies, Cybercrime and Cyber-terrorism. Cybercrime and Indian ITA 2000.

Reference Books:
1. Cyber Security by Nina Godbole & Sunit Belapure
2. Cryptographic & N/W security: Principles & Practices by Stalling, Prentice Hall.
3. Network Security Essentials: Applications & standards by Stalling, Pearson Education Asia, 2003.

Paper 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 very short questions of 1 mark each (attempt any 10).
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 characteristics, Scope of Data warehousing, Data Cube Technology, Planning of Data Warehouse, Data Warehouse Designing approaches. Data Warehouse Delivery Methods.

UNIT-II
System Processes, Query Management Process. Process Architecture of Data Warehousing, Database Schema- Fact tables and Dimension tables, Star Schema, SnowFlake Schema, Star flake schema, Multi-dimension schemas. Horizontal and vertical partitioning, Hardware partitioning.

UNIT-III
Data Marts, Types of Data Marts. Metadata-Data Transformation, Hardware Architecture - Process, Server, Network and Client hardware, Database Concept of data warehouse, Database structures and layout and file systems.

UNIT-IV
Data Mining: Data mining concepts, Characteristics of data mining, Scope, Data Mining Architecture, Data mining methodologies, data preprocessing: data cleaning, data reduction, data transformation, technologies used for data mining, Role of Data Mining in AI.

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 kamber, jian pei
5. John Poole, Dan Chang, Dauglas Talbert,"Common Warehourse Metadata Developer's Guide", Wiley pub.

Elective Paper

Paper PBCA604-A: Artificial Intelligence and Expert 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 very short questions of 1 mark each (attempt any 10).
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, prepositional 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.

Reference 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.

Elective Paper

Paper PBCA604-B: 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 very short questions of 1 mark each (attempt any 10).
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 Multimedia Systems: History of Multimedia Systems, Desirable Features for a Multimedia System, Components of a Multimedia System, Applications, Trends in Multimedia. Multimedia Systems and Applications: Categorization of Multimedia.

UNIT-II
Computer Animation: Introduction, 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-III
Basic drawing Tool and Selections, Applying gradients, Creating a custom gradient, Layer & its Operations, Controlling the speed of a motion tween, Arranging and extending frames Scenes and Frame Labels: Creating a Scenes & its Operations.

UNIT-IV
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 animation. Working with colors pallete, 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

The Project Training for the students is mandatory and it is an in-house training. The trainer will be from the industry to train them on the respective technologies and so it will be a paid training.

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.