PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)

(Estd. under the Panjab University Act VII of 1947 — enacted by the Govt. of India)

FACULTY OF SCIENCE

SYLLABI

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A)

(SEMESTER SYSTEM)
PART-I, II, III
(FIRST to Sixth Semester)
FOR

2020 – 2021 SESSIONS

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Panjab University, Chandigarh

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Scheme of Examination and Syllabus of BCA w.e.f. 2020 - 2021.

Bachelor of Computer Applications Semester – I

Paper Code	Title	L	T		Total	Int	Ext	Total	Exam. Duration	Credits
BCA-16-101	English(Compulsory)-A	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-102	Fundamentals of Mathematical Statistics	6	1	-	7	10	65	75	3 Hrs	3
BCA-16-103	Computer Fundamentals and Computing Software	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-104	Problem Solving Through C	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-105	Lab based on BCA-16-103	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-106	Lab based on BCA-16-104	-	-	6	6	-	50	50	4 Hrs	2
	Environment & Road Safety Education									
	Total	**24**	**1**	**12**	**37**	**40**	**360**	**400**		**16**

Bachelor of Computer Applications Semester – II

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Exam. Duration	Credits
BCA-16-201	English (Compulsory)-B	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-202	Computer Organization	6	1	-	7	10	65	75	3 Hrs	3
BCA-16-203	Fundamentals of Web Programming	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-204	Object Oriented Programming using C++	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-205	Lab based on BCA-16-203	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-206	Lab based on BCA-16-204	-	-	6	6	-	50	50	4 Hrs	2
	Total	**24**	**1**	**12**	**37**	**40**	**360**	**400**		**16**

***The Environment, Road Safety Education, Drug Abuse & Violence against Women is a compulsory qualifying paper which the students have to study in the B.C.A. 1st year (2nd Semester). If the students failed in qualify the paper during 2nd Semester, he / she / they be allowed to appear / qualify the same in the 4th or 6th semester/s.**

Bachelor of Computer Applications Semester – III

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Exam. Duration	Credits
BCA-16-301/ BCA-16-302	Punjabi-A/ History & Culture of Punjab – A	6	-	-	6	05	45	50	3 Hrs	3
BCA-16-303	Information System Design and Implementation	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-304	Computer Oriented Numerical Methods	6	1	-	7	10	65	75	3 Hrs	3
BCA-16-305	Data Structures	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-306	Lab based on BCA-16-304	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-307	Lab based on BCA-16-305	-	-	6	6	-	50	50	4 Hrs	2
	Total	**24**	**1**	**12**	**37**	**35**	**340**	**375**		**16**

Bachelor of Computer Applications Semester – IV

Paper Code	Title	L	T	P	Total	Int	Ext	Total		Credits
BCA-16-401/ BCA-16-402	Punjabi-B/History & Culture of Punjab – B	6	-	-	6	05	45	50	3 Hrs	3
BCA-16-403	Software Project Management	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-404	Operating System Concepts and Linux	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-405	Database Management System	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-406	Lab based on BCA-16-404	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-407	Lab based on BCA-16-405	-	-	6	6	-	50	50	4 Hrs	2
	Total	**24**	**-**	**12**	**36**	**35**	**340**	**375**		**16**

Bachelor of Computer Applications Semester – V

Paper Code	Title :	L	T	P	Total	Int	Ext	Total	Exam. Duration	Credits
BCA-16-501	Computer Networks	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-502	Discrete Mathematical Structure	6	1	-	7	10	65	75	3 Hrs	3
BCA-16-503	Java Programming	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-504	Web Application Development using PHP	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-505	Lab based on BCA-16-503	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-506	Lab based on BCA-16-504	-	-	6	6	-	50	50	4 Hrs	2
		24	**1**	**12**	**37**	**40**	**360**	**400**		**16**

Bachelor of Computer Applications Semester – VI

Paper Code	Title	L	T	P	Total	Int	Ext	Total	Exam. Duration	Credits
BCA-16-601	E-Commerce	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-602	Application Development using VB.Net	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-603	Computer Graphics and Multimedia Applications	6	-	-	6	10	65	75	3 Hrs	3
BCA-16-604	Lab based on BCA-16-603	-	-	6	6	-	50	50	4 Hrs	2
BCA-16-605	Major Project and Seminar	-	-	12	12	10	115	125		5
	Total	**18**	**-**	**18**	**36**	**40**	**360**	**400**		**16**

* This is a compulsory qualifying paper, which the students have to study in the B.A./B.Sc./B.Com./B.C.A.1st year. The students are required to qualify this paper either in the first year, second year and third year of the course. The examination will be conducted by the University.

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FIRST SEMESTER

: **English (Compulsory) – A**
BCA-16-101

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Semester I

Book Prescribed: **Colours of Expression** by Harbhajan Singh published by Publication Bureau, Panjab University, Chandigarh

Section A

1) **Short Stories** (1& 2)
One essay type question on summary/Character/Incident (one out of two with internal choice)
10 marks

II) **Prose (1 to 3)**
Long essay type question on Summary/Theme(one out of two with internal choice)
10 marks

III) **Poetry** (1 to 6) **15 marks**
Summary (one out of two with internal choice) **5 marks**
Short Questions (two out of three) **5 marks**
Reference to the Context (one out of two with internal choice) **5 marks**

Section B

1) Word formation from Prose and Stories and their use in sentences (5 out of 8)
10 marks

2) Use of textual words and idioms in sentences (5 out of 8) **10 marks**

3) Translation from Hindi/Punjabi to English **5 marks**
(a small Paragraph)

OR

For Foreign Students (Paraphrase of Poetry Passage)

4) Official, Business and Letters to the Editors **5 marks**

Fundamentals of Mathematical Statistics
: **BCA-16-102**

L	T	P	Cr	External Marks: 65
6	1	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: To teach the students the basic techniques of Statistical Methods. After completing this course students will be able to solve various Financial, Scientific and Engineering fields' problems.

Note :

i. The Question Paper will consist of Four Units.
ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
iv. All questions carry equal marks unless specified.
v. **The student can use only Basic (Non-programmable) type of Calculator.**
vi. **Log tables are allowed. Students may be provided the same for computation.**

UNIT - I

Basic Statistics: Types of Statistics, Different Statistical Techniques, Steps in Statistical Investigation, Uses and Limitations of statistics, Collection of Data: Sources of collecting primary and Secondary Data, Limitations of Secondary Data, Criteria of evaluating secondary data, Organization of data, Graphs of Grouped Frequency Distribution, Tabulation of Data, Parts of Table

Measures of Central Tendency: Kinds of measures of central tendency (statistical averages or averages):

Arithmetic Mean: Simple Arithmetic Mean, Methods of calculating Simple Arithmetic Mean, Arithmetic Mean in case of Individual Series, Discrete series and continuous series, Weighted Arithmetic Mean, Combined Arithmetic Mean.

Geometric Mean: Simple Geometric Mean, Methods of calculating Simple Geometric Mean, Geometric Mean in case of Individual Series, Discrete series and continuous series, Weighted Geometric Mean, Combined Geometric Mean.

Harmonic Mean: Simple Harmonic Mean, Methods of calculating Simple Harmonic Mean, Harmonic Mean in case of Individual, Discrete series and continuous series, Weighted Harmonic Mean, Combined Harmonic Mean.

UNIT - II

Median: Methods of Calculating Median in case of Individual, Discrete series and continuous series

Partition Value: Quartile, Quintiles, Hexiles, Septiles, Octiles, Deciles, Percentiles

Mode: Methods of Calculating Mode in case of Individual Series, Discrete series and continuous series

Range: Computation of Range, Inter Quartile Range, Computation of Inter Quartile Range, Percentile Range and Computation of Percentile Range.

Mean Deviation, Computation of Mean Deviation, Standard Deviation, Calculation of Standard Deviation, Variance, Calculation of Standard Deviation for individual Series, Discrete Series and Continuous Series, Coefficient of Standard Deviation and coefficient of variation, Combined Standard Deviation, Correcting incorrect Standard Deviation

UNIT - III

Correlation Analysis : Correlation Analysis: Definition, Types of Correlation: Positive, Negative, Simple, Multiple, Partial, Total, Linear and Non-Linear. Need of Correlation Analysis, Correlation and Causation, Techniques for Measuring Correlation: Scatter Diagram Method, Graphic Method, Karl Pearson's Coefficient of Correlation: Correcting incorrect coefficient of correlation, calculating Karl Pearson's coefficient of correlation in case of grouped series, Probable Error, Coefficient of Determination, Spearman's coefficient of Correlation (Rank correlation): Calculation of Correct Coefficient of rank correlation, Difference between Rank Coefficient and Karl Pearson's coefficient of coefficient, Coefficient of concurrent deviation.

UNIT - IV

Regression Analysis (Linear Regression): Definition, Difference between Correlation and Regression, Types of Regression Analysis: Simple, Multiple, Partial, Total, Linear and Non-Linear, Objectives of Regression Analysis, Methods of obtaining regression analysis: Regression Lines, Regression Equations. Methods of obtaining regression equations: Normal Equations and Regression Coefficient, Properties of Regression Coefficient, Standard Error of Estimate, Regression Coefficient in case of Grouped Data, Uses of Regression Analysis and Limitations of Regression Analysis.

Suggested Readings:

1. Gupta S.C, Kapoor V.K. : Fundamentals of mathematical Statistics, Sultan Chand & Sons.
2. Gupta, S.P., 2003 : Statistical Methods, S. Chand.
3. Affi, A.A, 1979 : Statistical Analysis: A Computer Oriented Approach, Academic Press, Inc.

Computer Fundamentals and Computing Software
: **BCA-16-103**

L	T	P	Cr	
6	-	-	3	

External Marks: 65
Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives: The objective of this course is to familiarize students with complete Fundamentals and the packages commonly used in computing software.

Note :

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

UNIT - I

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

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

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

UNIT - II

Understanding Operating System using DOS : Introduction to operating systems and its functions, DOS and versions of DOS, Booting sequence; Warm and Cold Boot; Concepts of files and directories, Redirecting command input and output using pipes, Wildcard characters, Types of DOS commands: Internal and External; Internal Commands: DIR, MD, CD, CLS, COPY, DATE, DEL, PATH, PROMPT, REN, RD, TIME, TYPE, VER, VOL; External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS, FORMAT, CHKDSK, DISKCOPY, LABEL, MOVE, TREE, DELTREE, DEFRAG, SCANDISK, UNDELETE. Batch Files: Introduction to simple batch files; Introduction to CONFIG.SYS and AUTOEXEC.BAT files.

Understanding Graphical User Interface using Windows: Fundamentals of Windows, Types of Windows, Anatomy of windows, Icons, Recycle bin, Operations on Folders, Registry of Windows: Basics, Editing; Control panel.

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UNIT - III

Word Processing Package: Opening, saving and closing an existing document; renaming and deleting files; Using styles and templates: Introduction to templates and styles; applying, modifying and creating new (custom) styles; using a template to create a document, creating a template, editing a template, organizing templates, examples of style use, Changing document views, Moving quickly through a document, Working with text: select, cut, copy, paste, find and replace, inserting special characters, setting tab stops and indents, Checking spelling and Grammar, Autocorrect, Using built-in language tools, word completion, Autotext, Formatting text: Using Styles, formatting paragraphs, formatting characters, auto-formatting, creating lists; Formatting pages: Using layout methods, creating headers and footers, Numbering pages, Changing page margins, Adding comments to a document, Creating a table of contents, Creating indexes and bibliographies, Printing a document, Using mail merge, Tracking changes to a document, Using fields, Linking to another part of a document, Using master documents, Creating fill-in forms.

UNIT - IV

Spreadsheet Package: Introduction to Spreadsheets, sheets and cells; Opening and saving spreadsheet files; Working with sheets: inserting new sheet, deleting and renaming sheets, Viewing a spreadsheet: freezing rows and columns, splitting screen, Entering data: cell referencing, formatting cells, entering numbers, entering numbers as text, entering formulae, entering date and time, deactivating automatic changes, Speeding up data entry: using fill tool, fill series, defining fill series, Validating cell contents, Formatting data: formatting text, numbers, cells, Autoformatting cells and sheets, defining new autoformat, Using conditional formatting, Hiding and showing data, Sorting records, Printing a spreadsheet document: using print ranges, page formats, inserting page breaks, headers and footers; Working with Graphs and Charts : Creating Embedded Chart, formatting chart: Changing chart types, adding Titles, Legends and Gridlines, Printing Charts; Adding database functions: defining database ranges, sorting, filtering and grouping database ranges; Evaluating data: using DataPilot; Functions and Macros: using and editing existing macro, Creating Macros, Recording Macros, Running Macros.

Presentation Packages: Basics of creating a presentation, Parts of main window, workspace views, creating a presentation, Incorporation of Animation.

Note: Any word processing, spreadsheet and presentation package may be used. Focus should be on open source software's.

Suggested Readings:

1. Basandra, S.K. : Computers Today, Galgotia.
2. Sinha P.K. & Sinha Priti : Computer Fundamentals, BPB Publications
3. Mathur Rajiv, 1995: DOS 6.2 Quick Reference, Galgotia.
4. OOoAuthors Team : Getting Started with OpenOffice.org 3.3, Friends of OpenDocument
5. Singleton, Roderick G.: OpenOffice.org User Guide.

Problem Solving Through C
: **BCA-16-104**

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of this course is to make the student understand programming language concepts, mainly control structures, reading a set of data, stepwise refinement, function and arrays. After completion of this course, the student is expected to analyze the real life problem and write programs in 'C' language to solve problems. The main emphasis of the course is on problem solving aspect.

Note :

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

UNIT - I

Programming Process: Steps in developing of a program, Data Flow Diagram, Decision Table, Algorithm development, Flowchart, Pseudo Code, Testing and Debugging.
Fundamentals of C Languages: History of C, Character Set, Identifiers and Keywords, Constants, Types of C Constants, Rules for Constructing Integer, Real and character Constants, Variables, Data Types, rules for constructing variables.
Operators and Expressions: C Instructions, Arithmetic operators, Relational operators, Logical operators, Assignment Operators, Type Conversion in Assignments, Hierarchy of Operations, Standard and Formatted Statements, Structure of a C program , Compilation and Execution.

UNIT - II

Decision Control Structure: Decision making with IF-statement, IF-Else and Nested IF-Else, The else if Clause.
Loop Control Structure: While and do-while, for loop and Nested for loop,
Case Control Structure: Decision using switch, Thegoto statement.
Functions: Library functions and user defined functions, Global and Local variables, Function Declaration, Calling and definition of function, Methods of parameter passing to functions, recursion, Storage Classes in C.

UNIT - III

Arrays: Introduction, Array declaration, Accessing values in an array, Initializing values in an array, Single and Two Dimensional Arrays, Initializing a 2-Dimensional Array, Memory Map of a 2-Dimensional Array, Passing array elements to a function: Call by value and call by reference, Arrays of characters, Insertion and deletion operations, Searching the elements in an array, Using matrices in arrays, Passing an Entire Array to a Function.

Pointers: Pointer declaration, Address operator "&", Indirection operator "*", Pointer and arrays, Pointers and 2-Dimensional Arrays, Pointer to an Array, Passing 2-D array to a Function, Array of Pointers.
Dynamic Memory Allocation: malloc(), calloc(), realloc(), free() functions.

UNIT - IV

String Manipulation in C: Declaring and Initializing string variables, Reading and writing strings, String Handling functions(strlen(), strcpy(), strcmp(), strcat()).
Structures and Unions: Declaration of structures, Structure Initialization, Accessing structure members, Arrays of structure, Nested structures, Structure with pointers, Union.
Files in C: Introduction, Opening and Closing files, Basic I/O operation on files.

Suggested Readings:

Essential :

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

Further Reading:

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

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SECOND SEMESTER

English (Compulsory) – B
BCA-16-201

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L	T	P	Cr	
6	-	-	3	**External Marks: 65**
				Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Semester II

Book Prescribed: **Colour of Expression** by Harbhajan Singh published by Publication Bureau, Panjab University, Chandigarh

Section A

1) **Short Stories** (3-5)
One essay type question on summary/Character/Incident (one out of two with internal choice) **10 marks**

2) **Prose (4-5)**
Long essay type question on Summary/Theme (one out of two with internal choice) **10 marks**

3) Poetry (7-11) **15marks**
Summary (one out of two with internal choice) **5 marks**
Short Questions (two out of three) **5 marks**
Reference to the Context(one out of two with internal choice) **5 marks**

Section B

1) Paragraph Writing(Descriptive and Narrative) **10 marks**

2). Use of textual words and idioms in sentences (5 out of 8) **10 marks**

3). Translation from Hindi/Punjabi to English **5 marks**
(isolated sentences)

OR

For Foreign Students (Paraphrase of Poetry Passage)

4) Transformation of all types (5 out of 5) **5 marks**

Computer Organization
BCA-16-202

L	T	P	Cr	
6	1	-	3	

External Marks: 65
Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives: This course will enable the student to understand the basic organization of computer system and system maintenance.

Note :

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

UNIT - I

Computer Organisation: Evolution of Computers, Von Neumann Architecture, Combinatorial Blocks : Gates, Half Adder, Full Adder, Multiplexers, Decoders, Encoders; Sequential Building blocks : Flip Flops, Registers, Counters,
Information representation: codes, fixed and floating point representation
Arithmetic: Addition and subtraction for sign magnitude and 2's complement numbers, integer multiplication using Booth's algorithms

UNIT - II

Architecture of a Simple Processor: Architecture of 8086/8088 microprocessor, instruction set, Addressing Modes.
Instruction: Microinstructions: Register Transfer, Arithmetic, Logical and Shift, Types of Instructions, Instruction Cycle.
Interrupt: Types, Interrupt Cycle
I/O organization: Strobe based and Handshake based communication, DMA based data transfer;

UNIT - III

Memory Organisation: Memory Hierarchy, RAM (Static and Dynamic), ROM Associative memory, Cache memory organisation, Virtual memory organisation.
Assembly Language : Features of Assembly Language, Machine Language vs Assembly Language, Pseudo Instruction; use of Assembly for programs: Addition, Subtraction, Multiplication using Subroutines and Basic Input/ Output.

UNIT - IV

System Maintenance: Introduction to various physical components of a computer, Physical Inspection and Diagnostics on PC, Functional description of various Internal and External cards; Viruses: Types of Computer Viruses, Detection, prevention and protection from Viruses.

Suggested Readings:

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Essential :

1. M. Morris Mano, 1993. : Computer System Architecture, Prentice Hall International, 3rd Ed.,

Further Reading :

2. P. Pal Choudhri, 1994. : Computer Organisation and Design, Prentice Hall of India.
3. Biswal, Sadasiva, 2001 : Basic Electronics, Pub-Atlantic, New Delhi.
4. B. Govindarajalu, 1994. : IBM-PC and Clones - Hardware Troubleshooting and Maintenance, Tata-McGraw-Hill.

Fundamentals of Web Programming

: **BCA-16-203**

L	T	P	Cr	
6	-	-	3	**External Marks: 65**
				Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives: This course will enable the student to build and publish web sites using HTML, DHTML, CSS, JavaScript and Dreamweaver.

Note :

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

UNIT - I

Basic Terminology: Web Server; Web Client/Browser, Understanding how a Browser communicates with a Web Server, Website, Webpage, Static Website, Dynamic Website, Internet, Intranet, Extranet, WWW, URL

HTML: Structure of an HTML program, Paragraph Breaks, Line Breaks; Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.)

Lists: Unordered List, Ordered Lists, Definition lists

Adding Graphics to HTML Documents using the Border, Width, Height, Align, ALT Attributes

Tables: Caption Tag, Width, Border, Cell padding, Cell spacing, BGCOLOR, COLSPAN and ROWSPAN Attributes.

UNIT - II

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

Frames: Introduction to Frames: The <FRAMESET> tag, The <FRAME> tag, Targeting Named Frames

DHTML: Introduction to cascading style sheets (CSS), Style tag, Link tag, Types of CSS: In-Line, Internal, External

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

UNIT - III

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

Other Built-In Objects in JavaScript: The String Object, The Math Object, The Date Object;

UNIT - IV

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

Web Hosting: Understanding Domain Name & Web Space, Getting a Domain Name & Web Space (Purchase or Free), Uploading the Website to Remote Server, Introduction to Open Source Third party FTP Tools

Suggested Readings:

Essential :

1	Wanger & Wyke	:	Java Script Unleased, Pearson Education, New Delhi.
2	Bayross, Ivan :	:	HTML, DHTML, Java Script by BPB, Latest reprint
3	Schildt , Herbert	:	The Complete Reference Java 2, TMH, Latest reprint
4	Joseph Lowery	:	Adobe Dreamweaver CS5 Bible Paperback Edition

Further Reading :

5	Thomas Powell	:	HTML & CSS: The Complete Reference
6	John Pollock	:	JavaScript, A Beginner's Guide
7	Janine C. Warner	:	Dreamweaver CS5 For Dummies Paperback Edition
8	David Powers	:	The Essential Guide to Dreamweaver CS4

Object Oriented Programming using C++
: BCA-16-204

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives: By the end of the course, students will be able to write C++ programs using the more esoteric language features, utilize Object Oriented techniques to design C++ programs, use the standard C++ library, and explore advanced C++ techniques.

Note :

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

UNIT - I

Principles of Object Oriented Programming (OOP): Introduction to OOP, Difference between OOP and Procedure Oriented Programming; Concepts: Object, Class, Encapsulation, Abstraction, Polymorphism and
Inheritance, Applications of OOP. Special operators: scope resolution operator, Member Dereferencing operators, Memory management operators, Manipulators and Type cast operator
Structure of a C++ Program and Classes and Objects : Class Declaration : Data Members, Member Functions, Private and Public members, Creating Objects, Accessing class data members, Accessing member functions; Class Function Definition: Member Function definition inside the class declaration and outside the class declaration.

UNIT - II

Friend function, inline function, Static members, Function Overloading, Arrays within a class. Arrays of Objects; Objects as function arguments: Pass by value, Pass by reference, Pointers to Objects.
Constructors: Declaration and Definition, Types of Constructors, (Default, Parameterized, Copy Constructors). Destructors: Definition and use.
Operator Overloading & Type Conversion: Conversion from basic type to user defined type, User defined to basic type and one user defined conversion to another user defined type.

UNIT - III

Inheritance: Extending Classes Concept of inheritance, Base class, Defining derived classes, Visibility modes : Public, Private, Protected ;Types of Inheritance: Single inheritance :

Privately derived, Publicly derived; Making a protected member inheritable, multilevel inheritance, multiple Inheritance and ambiguity of multiple inheritance, Hierarchal Inheritance, Hybrid, Nesting of classes.

Polymorphism: Definition, Application and demonstration of Data Abstraction, Encapsulation and Polymorphism. Early Binding, Polymorphism with pointers, Virtual Functions, Late binding, pure virtual functions.

UNIT - IV

Exception Handling: Definition, Exception Handling Mechanism : Throwing mechanism and Catching Mechanism, Rethrowing an Exception

File Processing : Opening and closing of file, Binary file operations, structures and file operations, classes and file operations, Random file processing.

Suggested Readings :

Essential :

1. E. Balaguruswamy, 2008 : Object Oriented Programming with C++, TMH.

Further Reading :

2. Bjarne Stroustrup, 2009 : The C++ Programming Language, Addison-Wesley Publishing Company.
3. Robert Lafore, 2003 : Object Oriented Programming in Turbo C++, Galgotia Pub.
4. Salaria, R. S. : Object Oriented Programming Using C++, Khanna Book Publishing Co. (P.) Ltd., New Delhi.

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THIRD SEMESTER

Punjabi – A
BCA-16-301

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ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਦਸੰਬਰ 2019 ਦੇ ਇਮਤਿਹਾਨ ਲਈ

ਕੁੱਲ ਅੰਕ : 50
ਥਿਊਰੀ : 45
ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ: 05
ਸਮਾਂ: 3 ਘੰਟੇ

ਸਿਲੇਬਸ

1. ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵੀਆਂ ਦੀਆਂ ਚੋਣਵੀਆਂ ਕਵਿਤਾਵਾਂ ਦਾ ਅਧਿਐਨ
2. ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦਾ ਅਧਿਐਨ
3. ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਲੇਖਕਾਂ ਦਾ ਸੰਖੇਪ ਜੀਵਨ ਤੇ ਰਚਨਾ/ਯੋਗਦਾਨ

ਕੋਰਸ

1. ਸੁਰ-ਸੰਵੇਦਨਾ, ਸੰਪਾ: ਡਾ.ਸਤਿੰਦਰ ਸਿੰਘ ਵਿਚੋਂ ਚੋਣਵੀਆਂ 15 ਕਵਿਤਾਵਾਂ,
   ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ ਪਬਲੀਕੇਸ਼ਨ ਬਿਓਰੋ, ਚੰਡੀਗੜ੍ਹ
   (ਭਾਈ ਵੀਰ ਸਿੰਘ- ਗੁਲਾਬ ਦਾ ਫੁੱਲ ਤੋੜਨ ਵਾਲੇ ਨੂੰ, ਵਿਛੋੜਾ-ਵਸਲ, ਖੇੜਾ, ਪੂਰਨ ਸਿੰਘ- ਜਵਾਨ ਪੰਜਾਬ, ਸਮੁੰਦਰ ਕਿਨਾਰੇ ਮੈਂ ਉਡੀਕਾਂ, ਗਰਾਂ ਦਾ ਮਿਹਨਤੀ ਬਲਦ, ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਿਕ- ਰਾਧਾ ਸੰਦੇਸ਼, ਏਕੇ ਦੀ ਬਰਕਤ, ਪੰਜਾਬੀ ਦਾ ਸੁਪਨਾ, ਮੋਹਨ ਸਿੰਘ- ਮਾਂ, ਦੇਸ਼ ਪਿਆਰ, ਹਵਾ ਦਾ ਜੀਵਨ ਅਤੇ ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ- ਆਖਾਂ ਵਾਰਸ ਸ਼ਾਹ ਨੂੰ, ਸੱਤ ਵਰ੍ਹੇ ਅਤੇ ਅਸ਼ੋਕਾ ਚੇਤੀ ਕਵਿਤਾਵਾਂ)
2. ਪੰਜਾਬੀ ਕਥਾ-ਕਿਤਾਬ, ਸੰਪਾ: ਗੁਰਦਿਆਲ ਸਿੰਘ ਵਿਚੋਂ ਚੋਣਵੀਆਂ 6 ਕਹਾਣੀਆਂ
   ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਓਰੋ, ਚੰਡੀਗੜ੍ਹ।
   (ਏਹੁ ਨਿਦੋਸਾ ਮਾਰੀਐ, ਸਵਰਗ ਦੀ ਝਲਕ, ਮਾਮਲਾ, ਉਜਾੜ, ਬਸ਼ੀਰਾ ਅਤੇ ਰੱਬ ਤੇ ਰੁੱਤਾਂ ਕਹਾਣੀਆਂ)

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1.	ਸੁਰ-ਸੰਵੇਦਨਾ ਪੁਸਤਕ ਵਿੱਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (2 ਵਿਚੋਂ 1)	5 ਅੰਕ
2.	ਕਿਸੇ ਇੱਕ ਕਵਿਤਾ ਦਾ ਸਾਰ ਜਾਂ ਕੇਂਦਰੀ ਭਾਵ (3 ਵਿਚੋਂ 1)	5 ਅੰਕ
3.	ਇਕ ਕਹਾਣੀ ਦਾ ਸਾਰ (ਪੰਜਾਬੀ ਕਥਾ-ਕਿਤਾਬ ਵਿਚੋਂ)	5 ਅੰਕ
4.	ਕਿਸੇ ਇੱਕ ਕਵੀ ਜਾਂ ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਰਚਨਾ ਅਤੇ ਯੋਗਦਾਨ (ਭਾਈ ਵੀਰ ਸਿੰਘ, ਪ੍ਰੋ ਮੋਹਨ ਸਿੰਘ, ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, ਸੁਜਾਨ ਸਿੰਘ, ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ ਅਤੇ ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ) (2 ਵਿਚੋਂ 1, ਇੱਕ ਕਵੀ ਅਤੇ ਇੱਕ ਕਹਾਣੀਕਾਰ ਵਿੱਚੋਂ)	8 ਅੰਕ
5.	ਲੇਖ : ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ ਅਤੇ ਆਮ ਵਾਕਫ਼ੀ ਨਾਲ ਸੰਬੰਧਤ (500 ਸ਼ਬਦਾਂ ਤੱਕ)	7 ਅੰਕ
6.	ਸ਼ਬਦ ਸ਼ੁੱਧੀ (10 ਅਸ਼ੁੱਧ ਸ਼ਬਦ-ਜੋੜਾਂ ਵਿੱਚੋਂ 7)	7 ਅੰਕ
7.	ਵਾਕ ਸ਼ੁੱਧੀ (10 ਅਸ਼ੁੱਧ ਵਾਕਾਂ ਵਿੱਚੋਂ 8)	8 ਅੰਕ

ਵਿਸ਼ੇਸ਼ ਨੋਟ : ਸਮੁੱਚੇ ਪਾਠ ਕ੍ਰਮ ਲਈ ਹਫ਼ਤੇ ਵਿਚ 6 ਪੀਰੀਅਡ

OR

HISTORY AND CULTURE OF PUNJAB – A
BCA-16-302

HISTORY AND CULTURE OF PUNJAB – I

Instructions for the paper-setter and candidates: (for paper in Semester I & II)

1. The syllabus has been divided into four Units.
   There shall be 9 questions in all. The first question is compulsory and shall be short answer type containing 10 short questions spread over the whole syllabus to be answered in about 25 to 30 words each. The candidates are required to attempt any 5 short answer type questions. Each question will carry 1 mark. Rest of the paper shall contain 4 units. Each Unit shall have two essay type questions and the candidate shall be given internal choice of attempting one question from each Unit-IV in all. Each question will carry 10 marks.
2. For private candidates, who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will proportionately be increased to maximum marks of the paper in lieu of internal assessment.
   The paper-setter must put note (2) in the question paper.
3. One question from Unit-IV shall be set on the map.

Explanation:

1. Each essay type question would cover about one-third or one-half of a topic detailed in the syllabus.
2. The distribution of marks for the map question would be as under:
   Map : 06 Marks
   Explanatory Note : 04 Marks
   In case a paper setter chooses to set a question of map on important historical places, the paper setter will be required to ask the students to mark 6 places on map of 1 mark each and write explanatory note on any two of 2 marks each.
3. The paper-setter would avoid repetition between different types of question within one question paper.

PAPER : HISTORY AND CULTURE OF PUNJAB FROM THE EARLIEST TIMES TO 1849

Max. Marks	:	50
Theory	:	45
Internal Assessment	:	05
Time	:	3 Hours

Objectives: To introduce the students to the history of the Punjab region.
Pedagogy: Lectures, library work and discussions.

UNIT I

1. Harappan Civilization: extent and town planning and socio-economic life.
2. Life in Vedic Age: socio-economic and religious.
3. Growth of Jainism and Buddhism in Punjab on the region.

UNIT II

4. Society and Culture under Maurayas
5. Society and Culture under Gupta
6. Cultural Reorientation: main features of Bhakti; origin and development of Sufism

UNIT III

7. Evolution of Sikhism: teaching of Guru Nanak; Institutional Development -Manji, Masand, Sangat and pangat.
8. Transformation of Sikhism: martyrdom of Guru Arjan; martyrdom of Guru Tegh Bahadur; impact.
9. Institution of Khalsa: new baptism; significance

UNIT IV

10. Changes in Society in 18th century: social unrest; emergence of misls and institutions-rakhi, gurmata, dal khalsa.
11. Society and Culture of the people under Maharaja Ranjit Singh
12. MAP (of undivided physical geographical map of Punjab): Major Historical Places: Harappa, Mohenjodaro, Sanghol, Ropar, Lahore, Amritsar, Kiratpur, Anandpur Sahib, Tarn Taran, Machhiwara, Goindwal, Khadur Sahib.

Suggested Readings:

1. Joshi, L.M (ed.) : History and Culture of the Punjab, Part-I, Publication Bureau, Punjabi University, Patiala, 1989 (3rd edn.)
2. Joshi, L.M and Singh, Fauja (ed.) : History and Culture of the Punjab, Vol. I, Punjabi University, Patiala, 1977
3. Prakash, Buddha : Glimpses of Ancient Punjab, P.U., Patiala, 1983
4. Thapar, Romila : A History of India, Vol. I, Penguin Books, 1966
5. Basham, A.L : The Wonder That was India, Rupa Books, Calcutta (18th rep.),1992
6. Sharma, B.N : Life in Northern India, Munshi Ram Manohar Lal, Delhi,1966
7. Singh,Kirpal : History and Culture of the Punjab, Part II(Medieval Period), Publication Bureau, Punjabi University, Patiala 1990(3rd edn.).
8. Singh, Fauja(ed.) : History of the Punjab, Vol.III, Punjabi University, Patiala, 1972
9. Grewal, J.S. : The Sikhs of the Punjab, the New Cambridge History of India, Orient Longman, Hyderabad,1990.
10. Singh, Khuwant : A History of the Sikhs, vol I: 1469-1839, Oxford University Press Delhi, 1991.
11. Chopra, P.N.,Puri, B.N.:A Social, Cultural and Economic History of India, Vol. II, and Das, M.N. Macmillan, Delhi, 1974.
12. Hussain ,Yusuf : Glimpse of Medieval Indian Culture, Asia Publishing House, Bombay, 1973(rep.).

Note: The following categories of the students shall be entitled to take option of History & Culture of Punjab in lieu of Punjabi as compulsory subject:

A. That the students who have not studied Punjabi upto class 10th.
B. Ward of / and Defence Personnel and Central Govt. Employee/Employees who are transferrable on all India basis.
C. Foreigners

Information System Design and Implementation

: **BCA-16-303**

L	T	P	Cr	
6	-	-	3	**External Marks: 65**
				Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: To teach the students about the various aspects of Information Systems to be developed their analysis and design. The motive is to aware the learners about pre requisite of software development and associated paradigms. After completing this course students will be able to be analyse and design information systems.

Note :

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

UNIT - I

Systems Concepts and Information Systems Environment: Definition and characteristics of a system. Elements of a system Environment: Boundaries and interface. Types of systems: Physical or Abstract Systems, Open and Closed System, Man - made information systems.

The System Development Life Cycle: Introduction to various phases-Recognition of Need, Feasibility Study, Analysis, Design, Implementation, Post– Implementation and Maintenance.

The Role of System Analyst: Skills of a System Analyst, various roles of the Analyst.

UNIT - II

System Planning and the Initial Investigation: Bases for planning in system analysis, Initial investigation, determining the users information requirements, Problem definition and Project Initiation, Background Analysis, Fact Finding, Fact Analysis, Determination of Feasibility.

Information Gathering: Introduction, Information Gathering tools: Review of Literature, Procedures and forms. On -site observation. Interviews and questionnaires.

Tools of Structured Analysis: Various tools of structured analysis: Data flow diagram (DFD), Data Dictionary, Decision tree and structured English, Decision table, Pros and cons of each tools.

UNIT - III

Feasibility Study: System Performance-statement of Constraints, Identification of Specific System Objectives, description of Outputs. Feasibility Study – Feasibility considerations, Steps in feasibility analysis. Feasibility Report.

System Design: The Process of Design-Logical and Physical Design, Design methodologies: Structured design, Functional Decomposition

System Testing and Quality Assurance: Testing, System testing, Quality assurance and its goals in its system life cycle, Levels of quality assurance, Trends in testing.

UNIT - IV

Implementation and Software Maintenance: Introduction, Conversion- Activity network for Conversion, File Conversion, User Training: Elements of user Training Post implementation review. Software Maintenance - Primary activities of a Maintenance Procedure, Reducing Maintenance Costs.

Hardware and Software Selection: Types of Software, Procedure for Hardware/Software selection: Major phases in selection, Evaluation and Validation, Vendor Selection, Post – Installation Review. Software selection- Criteria for Software Selection, the evaluation process.

Suggested Readings:

1. E.M. Awad: Systems Analysis and Design,Galgotia Publications(P)Ltd.

Further Reading :

2. Hardgrave Bill C. ,Siau Keng, Chiang Roger H.L., Systems Analysis and Design : Techniques, Methodologies, Approaches and Architectures 1st Edition, M.E. Sharpe Publications.

Computer Oriented Numerical Methods
: BCA-16-304 (Session 2020 – 2021)

L	T	P	Cr	External Marks: 65
6	1	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: To teach the students the essential techniques of Numerical Methods. After completing this course students will be able to solve various Scientific and Engineering fields' problems.

Note :

i. The Question Paper will consist of Four Units.
ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Unit and **ONE** compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt **ONE** question from each Unit and the Compulsory question.
iv. All questions carry equal marks unless specified.
v. **The student can use only Basic (Non-programmable) type of Calculator.**
vi. **Log tables are allowed. Students may be provided the same for computation.**

UNIT - I

Introduction to differentiation, integration and matrix algebra.

(No. of Lectures – 05)

Data Representation and Computer Arithmetic: Introduction, Concept of Exact and Approximate Numbers, Concept of Significant digits, Representation of Numbers in Memory, Storage of Integer Numbers: Signed Representation, 1's Complement Representation, 2's Complement Representation, Floating Point Numbers and their storage, Floating Point Arithmetic, Normalization and their consequences, Errors, Measures of Accuracy: Absolute Error, Relative Error and Percentage Error, Error types: Data Errors, Truncation Errors, Round-Off Errors, Computational Errors, Rules, Relationship between Relative Error and Significant digits and Error Propagation: Error Propagation in Addition Operation, Subtraction Operation, Multiplication Operation and Division Operation.

(No. of Lectures – 10)

UNIT - II

Solution of Non-Linear Equations: Introduction, Types of Non-Linear Equations: Polynomial Equations, Transcendental Equations, Methods of Finding Solutions of Non-Linear equations: Direct Method, Iterative Method.

Iterative Methods: Bisection Method, False-Position Method, Secant Method, Newton - Raphson Methods, Zeros of a polynomial using Birge – Vieta Method. Convergence of Iterative Methods, Comparison between Iterative Methods.

(No. of Lectures – 08)

Simultaneous Linear Equations: Solution of Simultaneous Linear Equations using Direct and Iterative Methods: Direct Methods: Gauss – Elimination Method, Gauss-Jordan Method, Concept of Pivoting, Iterative Method: Gauss-Seidal Method.

(No. of Lectures – 07)

UNIT - III

Interpolation: Introduction, Lagrange Interpolation, Inverse Interpolation, Finite Differences: Forward Differences, Backward Differences, Divided Differences, Difference Tables: Forward Difference Table, Backward Difference Table, Divided Difference Table, Observations regarding Difference Tables, Newton's Method of Interpolation: Newton' s Forward Difference Interpolation Formula, Newton' s Backward Difference Interpolation Formula, Newton' s Divided Difference Interpolation Formula.

(No. of Lectures – 10)

Numerical Integration: Introduction, Newton-Cotes Integration Formulae: Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8th Rule.

(No. of Lectures – 05)

UNIT - IV

Approximation: Approximation of functions: Taylor Series Representation, Chebyshev Polynomials.

(No. of Lectures – 07)

Solution of Ordinary Differential Equations: Introduction**,** Euler's Method, Runga–Kutta Methods: 2nd order & 4th order, Predictor Corrector Methods: Modified Euler's Method.

(No. of Lectures – 08)

Suggested Readings:

Essential :

1. Salaria,R.S. : Computer Oriented Numerical Methods,5th Edition, Khanna Book Publishing Co. (P.) Ltd., New Delhi

Further Reading :

2. Rajaraman,V.,2004 : Computer Programming in C, Prentice Hall of India.
3. S.S. Shastry : Introductory Methods of Numerical Analysis
4. H.C. Saxena : Finite differences and Numerical Analysis

Data Structures
: **BCA-16-305**

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: To teach the students various data structures and the basic operations performed using them. At the end of course the student will have complete knowledge of data structures, thus will be able to use them for solving real world problems.

Note :

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

UNIT - I

Basic Concepts: Introduction to Complexity, Data Structure and Data Structure operations. Applications of Data Structure, Basic data Structures.
Arrays: Introduction, Types of Array, Memory representation, Applications and operations.
Stacks: Introduction, memory representation, Applications and operations, Recursion.

UNIT - II

Linked List: Operations:-traversing, searching, inserting, deleting, operations on header linked list, circular linked list, doubly linked list, memory representation, Applications, polynomial manipulation.
Queue: Introduction, Types, Memory Representation and Applications.

UNIT - III

Trees – Definition and Basic concepts, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Searching, Insertion and deletion in Binary trees, Binary Search tree.
Graphs: Introduction, Memory Representation, Graph Traversal (DFS and BFS)

UNIT - IV

Searching: Binary and Linear Search;
Sorting: Bubble sort, Insertion sort, Selection sort, Merge Sort, Quick sort.
Comparison of various Searching and Sorting algorithms.

Suggested Readings :

Essential :

1. Lipschuitz L. Seymour, 2001 : Data Structure, Schaum Outline Series, TMH, New Delhi.

Further Reading :

2. Tannenbaum, Aaro M., 1990 : Data Structure Using C, Pearson.
3. Salaria, R. S. : Data Structures & Algorithm Using C, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
4. Salaria, R. S., Test Your Skills in Data Structures, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
5. Sofat Sanjeev, Data Structure with C and C++, Khanna Book Publishing Co.
6. Patel, R.B., Expert Data Structure in C, Khanna Book Publishing Co.

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FOURTH SEMESTER

Punjabi (Compulsory) – B
BCA-16-401

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ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਅਪ੍ਰੈਲ /ਮਈ 2020 ਦੇ ਇਮਤਿਹਾਨ ਲਈ

ਕੁੱਲ ਅੰਕ : 50
ਥਿਊਰੀ : 45
ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ: 05
ਸਮਾਂ: 3 ਘੰਟੇ

ਸਿਲੇਬਸ

1. ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵੀਆਂ ਦੀਆਂ ਚੋਣਵੀਆਂ ਕਵਿਤਾਵਾਂ ਦਾ ਅਧਿਐਨ
2. ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦਾ ਅਧਿਐਨ
3. ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਲੇਖਕਾਂ ਦਾ ਸੰਖੇਪ ਜੀਵਨ ਤੇ ਰਚਨਾ/ਯੋਗਦਾਨ

ਕੋਰਸ

1. ਸੁਰ-ਸੰਵੇਦਨਾ, ਸੰਪਾ: ਡਾ.ਸਤਿੰਦਰ ਸਿੰਘ ਵਿਚੋਂ ਚੋਣਵੀਆਂ 15 ਕਵਿਤਾਵਾਂ, ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ ਪਬਲੀਕੇਸ਼ਨ ਬਿਓਰੋ, ਚੰਡੀਗੜ੍ਹ
(ਫ਼ੀਰੋਜ਼ਦੀਨ ਸ਼ਰਫ਼- ਪੰਜਾਬ, ਭਾਰਤ, ਮਾਂ ਦਾ ਦਿਲ, ਨੰਦ ਲਾਲ ਨੂਰਪੁਰੀ- ਭੋਲਾ ਪੰਛੀ, ਚੁੰਮ ਚੁੰਮ ਰਖੋ, ਸ਼ੌਕਣ ਮੇਲੇ ਦੀ, ਸ਼ਿਵ ਕੁਮਾਰ- ਲੱਛੀ ਕੁੜੀ, ਕੀ ਪੁੱਛਦਿਉ ਹਾਲ ਫ਼ਕੀਰਾਂ ਦਾ, ਬਿਰਹੜਾ, ਪਾਸ਼- ਇਨਕਾਰ, ਅਸੀਂ ਲੜਾਂਗੇ ਸਾਥੀ, ਗੀਤ, ਸੁਰਜੀਤ ਪਾਤਰ- ਖ਼ਤਾਂ ਦੀ ਉਡੀਕ, ਗ਼ਜ਼ਲ (ਕੋਈ ਡਾਲੀਆਂ 'ਚੋਂ) ਅਤੇ ਗ਼ਜ਼ਲ (ਮੇਰਾ ਸੂਰਜ ਡੁਬਿਆ ਹੈ) ਕਵਿਤਾਵਾਂ)

2. ਪੰਜਾਬੀ ਕਥਾ-ਕਿਤਾਬ, ਸੰਪਾ: ਗੁਰਦਿਆਲ ਸਿੰਘ ਵਿਚੋਂ ਚੋਣਵੀਆਂ 6 ਕਹਾਣੀਆਂ, ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਓਰੋ, ਚੰਡੀਗੜ੍ਹ।
(ਗਧੀ ਵਾਲਾ, ਕੁਰਸੀ, ਬਾਕੀ ਸਭ ਸੁੱਖ-ਸਾਂਦ ਹੈ, ਰੋਹੀ ਬੀਆਬਾਨ, ਜਿੱਥੋਂ ਸੂਰਜ ਉੱਗਦਾ ਹੈ ਅਤੇ ਪਰਛਾਵੇਂ ਕਹਾਣੀਆਂ)

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਸੁਰ-ਸੰਵੇਦਨਾ ਪੁਸਤਕ ਵਿੱਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (2 ਵਿਚੋਂ 1) — 5 ਅੰਕ
2. ਕਿਸੇ ਇੱਕ ਕਵਿਤਾ ਦਾ ਸਾਰ ਜਾਂ ਕੇਂਦਰੀ ਭਾਵ (4 ਵਿਚੋਂ 1) — 5 ਅੰਕ
3. ਇਕ ਕਹਾਣੀ ਦਾ ਸਾਰ (ਪੰਜਾਬੀ ਕਥਾ-ਕਿਤਾਬ ਵਿਚੋਂ) — 5 ਅੰਕ
4. ਕਿਸੇ ਇੱਕ ਕਵੀ ਜਾਂ ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਰਚਨਾ ਅਤੇ ਯੋਗਦਾਨ — 8 ਅੰਕ
(ਸ਼ਿਵ ਕੁਮਾਰ, ਪਾਸ਼, ਸੁਰਜੀਤ ਪਾਤਰ, ਗੁਰਦਿਆਲ ਸਿੰਘ, ਰਘੁਬੀਰ ਢੰਡ ਅਤੇ ਵਰਿਆਮ ਸੰਧੂ)
(2 ਵਿਚੋਂ 1, ਇੱਕ ਕਵੀ ਅਤੇ ਇੱਕ ਕਹਾਣੀਕਾਰ ਵਿੱਚੋਂ)
5. ਕਾਲਜ ਨਾਲ ਸਬੰਧਤ ਪ੍ਰੈਸ-ਨੋਟ (2 ਵਿਚੋਂ 1) — 8 ਅੰਕ
6. ਕਾਰੋਬਾਰੀ ਇਸ਼ਤਿਹਾਰ (2 ਵਿਚੋਂ 1) — 7 ਅੰਕ
7. ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹ — 7 ਅੰਕ

ਵਿਸ਼ੇਸ਼ ਨੋਟ : ਸਮੁੱਚੇ ਪਾਠ ਕ੍ਰਮ ਲਈ ਹਫ਼ਤੇ ਵਿਚ 6 ਪੀਰੀਅਡ

OR

: **History and Culture of Punjab – B**
BCA-16-402

HISTORY AND CULTURE OF PUNJAB-II

Instructions for the paper-setter and candidates: (for paper in Semester I & II)

1. The syllabus has been divided into four Units.
   There shall be 9 questions in all. The first question is compulsory and shall be short answer type containing 10 short questions spread over the whole syllabus to be answered in about 25 to 30 words each. The candidates are required to attempt any 5 short answer type questions. Each question will carry 1 mark. Rest of the paper shall contain 4 units. Each Unit shall have two essay type questions and the candidate shall be given internal choice of attempting one question from each Unit-IV in all. Each question will carry 10 marks.
2. For private candidates, who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will proportionately be increased to maximum marks of the paper in lieu of internal assessment.
   The paper-setter must put note (2) in the question paper.
3. One question from Unit-IV shall be set on the map.

Explanation:

1. Each essay type question would cover about one-third or one-half of a topic detailed in the syllabus.
2. The distribution of marks for the map question would be as under:
   Map : 06 Marks
   Explanatory Note : 04 Marks

   In case a paper setter chooses to set a question of map on important historical places, the paper setter will be required to ask the students to mark 6 places on map of 1 mark each and write explanatory note on any two of 2 marks each.
3. The paper-setter would avoid repetition between different types of question within one question paper.

PAPER: HISTORY AND CULTURE OF PUNJAB IN THE COLONIAL AND POST INDEPENDENCE TIMES

Max. Marks	:	50
Theory	:	45
Internal Assessment	:	05
Time	:	3 Hours

Objectives: To introduce the students to the history of Punjab region in the Modern times.
Pedagogy: Lectures, library work and discussions.

UNIT I

1. Introduction of Colonial Rule in Punjab: Annexation of Punjab, Board of Administration
2. Western Education: Growth of Education and rise of middle classes
3. Agrarian Development: Commercialization of agriculture; canalization and colonization.

UNIT II

4. Early Socio Religious Reform: Christian Missionaries; Namdharis; Nirankaris.
5. Socio Religious Reform Movements: activities of Arya Samaj; Singh sabhas; Ahmadiyas.
6. Development of Press & literature: growth of press; development in literature

UNIT III

7. Emergence Of Political Consciousness: Agrarian uprising 1907; Ghadar Movement.
8. Gurudwara Reform Movement: Jallianwala Bagh; foundation of SGPC and Akali Dal; Morchas; Activities of Babbar Akalis.
9. Struggle for Freedom: activities of revolutionaries - Naujawan Bharat Sabha; Kirti Kissan Movement; participation in mass movements – non co-operation, civil disobedience, Quit India.

UNIT IV

10. Partition and its Aftermath: resettlement; rehabilitation
11. Social Concerns In Post Independence Punjab: language; immigration; socio-economic issues.
12. MAP(Physical geographical map of undivided Punjab): Major Historical places: Delhi, Kurukshetra, Jaito, Ferozepur, Ambala, Amritsar, Lahore, Ludhiana, Qadian, Jalandhar, Lyallpur, Montgomery.

Suggested Readings:

1. Singh, Kirpal :History and Culture of the Punjab, Part II(Medieval Period), Publication Bureau, Punjabi University, Patiala 1990(3rd edn.).
2. Singh, Fauja(ed.) :History of the Punjab, Vol.III, Punjabi University, Patiala 1972.
3. Grewal, J.S. :The Sikhs of the Punjab, the New Cambridge History of India, Orient Longman, Hyderabad,1990.
4. Singh, Khuwant :A History of the Sikhs, vol I: 1469-1839, oxford University Press,. Delhi, 1991.
5. Chopra, P.N.,Puri, B.N.And Das,M.N. :A Social, Cu.ltural and Economic History of India, Vol.II, Macmillan, delhi, 1974.

Software Project Management
: BCA-16-403

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: To teach the students important concepts, terms related to various phases during the development of a software project. At the end of the course the student will be able to apply software project management techniques to manage a software project.

Note :

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

UNIT - I

Software Project Management and Process Groups: Introduction to project and project management, role of a project manager in project management, a system view of project management, Stakeholders of Project, Project phases and product life cycles, Evolution of software economics, Improving software economics: reducing product size, software processes, team effectiveness, automation through software environments, Principles of modern software management.

UNIT - II

Project Management Framework: Project Management Framework, Software Tools for Project Management, Issues in Project Staff Acquisition and Team formation and Development, Model based software architectures, Workflows of the process, Checkpoints of the process.

Project Integration: Integration Management: Project selection, project management plans, project execution, project monitoring and controlling, integrated change control;

UNIT - III

Scope Management: Scope Management: project scope statement, Work breakdown structures, Scope verification and scope control, Process instrumentation and seven core metrics.

Software management disciplines: Iterative process planning, Project organizations and responsibilities, Process automation.

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UNIT - IV

Project Scheduling: Time Management; Importance of Project Schedules, Sequencing and Scheduling Activity, Project Network Diagrams, PERT/CPM, Gantt charts, Critical chain scheduling.

Cost Management: Project Cost Management - Importance and Principles of Project Cost Management, Resource Planning, Cost Estimating Techniques and. Expert Judgment, Estimating by Analogy, COCOMO Model, Cost Budgeting and Control

Suggested Readings :

Essential :

1. Kathy Schwalbe, Information Technology Project management, Thomson Publication.
2. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw-Hill.

Further Reading :

3. Walker Royce, Software Project Management - A Unified, Addison-Wesley.
4. Pankaj Jalote, Software Project Management in Practice, Pearson Education.
5. S.A. Kelkar, Software Project Management, A Concise Study, Prentice-Hall India.

: Operating System Concepts and Linux

BCA-16-404

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of the module is to create skills of students in operating systems concepts and Linux commands.

Note :

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

UNIT - I

Operating Systems (OS): Introduction, its needs and services, Types of OS: Multi-user, Multitasking, Multiprocessing and Real time Operating Systems, Parallel systems, Distributed systems

Process Management: Introduction to Process, PCB, Process States, CPU Scheduling: Scheduling Criteria and Algorithms: FCFS, SJF, Priority, Round Robin, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling

UNIT - II

Deadlocks: Necessary and sufficient conditions for Deadlocks, Introduction to methods for handling deadlocks, deadlock detection and recovery

Memory Management: Logical vs Physical address space, Swapping, Introduction to Paging, Segmentation, Virtual Memory-Demand paging, Introduction to Page Replacement algorithms: FIFO, Optimal Page replacement and LRU

UNIT - III

Introduction to Linux: Linux's shell, Kernel, Features of Linux, History, Minimum system requirements, Boot and Root disks , Starting and stopping Linux system, passwords, logging in and out, terminal Handling commands: who, Understanding wildcards, Environment variables.

Understanding I/O Redirection and Piping: Introduction, cut, paste, sort, tee; Introduction to Regular Expressions and grep .

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

UNIT - IV

Process Management: Types of processes, ps, bg, fg, nice, kill.
Understanding System Administration activities: Superuser (su) command, Taking backups using tar, Managing disk space, Mounting and Un-mounting file system, Managing users, Managing printers with lpd, mknod, lpc, lpq, lprm.
Vi editor: starting vi, vi modes, inserting text, quitting vi, deleting text, copying and moving text, searching and replacing text.

Suggested Readings:

Essential :

1. Peterson, J.L.& Silberschatz, A., Operating System Concept, Addison Wesley, reading.
2. John Goerzen: Linux Programming Bible, IDG Books, New Delhi, 2000.

Further Reading :

3. Brinch, Hansen, Operating System Principles, Prentice Hall of India
4. Haberman, A.N., Introducing to Operating System Design Galgotia Publication, New Delh.
5. Sumitabha Das: Your Unix - The Ultimate Guide, TMH, 2000.

Database Management System
: **BCA-16-405**

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: This course aims at giving the students the insight of the underlying concepts of database management system and **implement them using Database software.**

Note :

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

UNIT - I

Basic Concepts: A Historical perspective, File Systems vs. DBMS, Characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of DBMS, Implication of Database approach.
Data Base Systems Concepts and Architecture: Schemas and Instances, DBMS architecture and Data Independence, Data base languages & Interfaces, DBMS functions and component modules.
Entity Relationship Model: Entity Types, Entity Sets, Attributes & Keys, Relationships, Relationship Types, Roles and Structural Constraints, Design issues, weak entity types, E-R Diagrams. Design of an E-R Database Schema, Reduction of an E-R Schema to Tables.

UNIT - II

Relational Data Model : Relational model concepts, Integrity constraints over Relations, Relational Algebra - Basic Operations.
Conventional Data Models : An overview of Network and Hierarchical Data Models.
Relational Data Base Design : Functional Dependencies, Decomposition, Desirable properties of decomposition, Normal forms based on primary keys (1 NF, 2 NF, 3 NF and BC NF).
RDBMS: Terminology, The 12 Rules (Codd's Rule) for an RDBMS.

UNIT - III

Understanding SQL-1: Data Types, Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, ordering the result of a

Query Aggregate Functions, Grouping the Result of a Query, creation and deletion of Views, Managing privileges with Grant and Revoke Command, COMMIT and ROLLBACK, Functions: Character Functions, Date Functions, Group Functions

UNIT - IV

Understanding SQL-II: Querying Multiple Tables using Equi-Joins, Cartesian Joins, Outer Joins, Self-Joins, SET Operators: Union, Intersect, Minus; Introduction to Nested Queries

PL/SQL: Introduction to PL/SQL, The Advantage of PL/SQL, PL/SQL Block Structure, PL/SQL Architecture, Fundamentals of PL/SQL, PL/SQL Data Types, Variables and Constants, Scope and Visibility of a Variable, Assignments and Expressions, Operator Precedence, Conditional and Iterative Control, Cursor Management in PL/SQL, Implicit/explicit Cursor Attributes, Exception Handling in PL/SQL; Predefined Exceptions, User Defined Exceptions, Database Trigger, types of triggers, dropping triggers, storage for triggers.

Suggested Readings:

Essential

1. Elmasri & Navathe: Fundamentals of Database systems, 3rd Edition, Addison Wesley, New Delhi.
2. Ivan Bayross : SQL, PL/SQL-The Program Language of ORACLE, BPB Publication, New Delhi.

Further Reading :

3. Korth & Silberschatz : Database System Concept, 4th Edition, McGraw Hill International Edition.
4. Raghu Ramakrishnan & Johannes Gehrke: Database Management Systems, 2nd edition, Mcgraw Hill International Edition.
5. C.J.Date : An Introduction to Data bases Systems 7th Edition, Addison Wesley, New Delhi.
6. Bipin C.Desai : An Introduction to Database System, Galgotia Publication, New Delhi
7. Abbey, Abramson & Corey : Oracle 8i-A Beginner's Guide Tata McGraw Hill Publishing Company Ltd.

FIFTH SEMESTER

Computer Networks
BCA-16-501

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of the course is to:

- Offer knowledge about computer network related hardware and software using a layered architecture.
- Provide good understanding of the concepts of network security, wireless and various emerging network technologies.

Note :

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

UNIT - I

Computer Network: Network Hardware and Software, Network Topologies, Uses of Computer Networks, OSI Reference Model, TCP/IP reference model, Comparison of OSI with TCP/IP model.

Physical Layer: Transmission media: Twisted pair, Coaxial cable, Fiber optics, Wireless Transmission (Radio, Microwave, and Infrared), Switching: Circuit Switching, Message Switching, Packet Switching & their comparisons. ISDN and its services, Multiplexing: Frequency Division, Time Division, Wave Length Division, MODEMS.

UNIT - II

Data Link Layer: Design Issue, Framing, Errors Detection and Correction Code: Check sum, CRC, Hamming code, Data Link Protocols for noisy and noiseless channels, Sliding Window Protocol: Stop and Wait ARQ, Go-back-N ARQ, Selective Repeat ARQ.

Medium Access Sub-Layer: Introduction to Static and Dynamic channel allocation, IEEE standards 802.3.

UNIT - III

Network Layer: Design Issues, network layer addressing, network layer datagram, IP addressed Classes. Sub netting-Sub network, Subnet mask, Routing Algorithm: Shortest Path Routing, Flooding, Broadcast and Multicast routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.

UNIT - IV

Application Layer: Domain Name system (DNS), DNS name space, DNS Servers, World Wide Web, HTTP, e-mail: Architecture and Services, Message Component, Multipurpose Internet Mail Extensions (MIME), Simple Mail Transfer Protocol (SMTP), Post Office Protocol (POP), Remote Login and File transfer protocol, Introduction to Network Security.

REFERENCES:

1. Andrew S. Tanenbaum, “Computer Networks”, Pearson Publication.
2. Behrouz A. Foroużan, “Data Communication and Networking”, Tata McGraw Hill.
3. Theodore S. Rappaport, “Wireless Communication: Principle and Practices”, Pearson Publication.
4. Charlie Kaufman, Radio Perlman, Mike Speciner, “Network Security”, PHI.
5. Mayank Dave,” Computer Networks”, Cengage Learning.

Discrete Mathematical Structure
BCA-16-502

L	T	P	Cr	External Marks: 65
6	1	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objectives : In this paper, Students will learn and be able to acquire the knowledge of Logic, Relations and Functions. Algebric Functions and Graph Theory will also be discussed in this paper.

Note :

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

UNIT - I

Set Theory : Relations and Functions : Set Notation and Description, subset, basic set operations, Venn Diagrams, laws of set theory, partitions of sets, min sets, duality principle, basic definitions of relations and functions, graphics of relations, properties of relations: injective, surjective and bijective functions, compositions.

UNIT - II

Recurrence : Recurrence Relations and Recursive Algorithms – Linear-Recurrence Relations with Constant Coefficients; Homogeneous Solutions : Particular Solution, Total Solution, Solution by the Method of Generating functions.

UNIT - III

Graph Theory : Graph and planar graphs – Basic Terminology, Multi-graphs, Weighted Graphs, Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits. Travelling Salesman Problem, Planar Graphs.

UNIT - IV

Automata Theory : Finite State Machines–Equivalent Machines, Finite State Machines as language Recognizers; Analysis of Algorithms - Time Complexity, Complexity of Problems.

References :

1. Doerr,A.and Kenneth, L.,Applied Discrete Structures for Computer Science, 1989 Galgotia Publications Pvt. Ltd.
2. Liu, C. L., 1985, Elements of Discrete Mathematics, McGraw Hill.
3. Seymour Lipschutz and Lipson, :2000 Solved Problems in Discrete Mathematics, McGraw- Hill., 1992

Java Programming
BCA-16-503

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: This course aims at giving student knowledge about all the programming concepts of JAVA programming language.

Note :

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

UNIT I

Java and the Internet: The Java programming language and its characteristics; Java development kit, Java run- time environment; Java compiler

Fundamentals of Java: Java Vs. C++, Byte Code, Java Virtual Machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructors, Garbage Collection, method overloading,
Inheritance: Different types of Inheritance, member access, using super keyword to call super class constructors, creating a multilevel hierarchy, method overriding, dynamic method dispatch, using abstract classes, using Final keyword.

UNIT II

I/O Basics: streams, the predefined streams; Reading console Input, Writing console Output.
Arrays and Strings: One-dimensional and two-dimensional Arrays, String Handling using String and StringBuffer class, String Functions.
Packages: Types of packages, defining a package, Importing packages, Access protection
Interfaces: Defining an Interface, Implementing Interfaces, Variables in Interfaces, Achieving multiple inheritance using interfaces, Interface and Abstract classes.

UNIT III

Exception Handling: Java Exception handling model, Types of exception, using Try and catch, Multiple Try and Catch clauses, Nested Try statements, finally block, user defined exceptions.
Multi-threaded Programming: The Java Thread model, the Thread class and Runnable interface, Creating a Thread using Runnable Interface and extending Thread, Creating Multiple Threads, Thread Priorities, Synchronizations: Methods, Statements, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads.
Applet Programming: Introduction, Types of applet, Life Cycle, Incorporating an applet into web page using Applet Tag, running applets, using Graphics class and its methods to draw lines, rectangles, circles, ellipses, arcs and polygons.

UNIT IV

Using AWT controls: Introduction to AWT, Creating GUI Applications using AWT, AWT controls: Label, TextBox, TextArea, Check Boxes, Radio Buttons, Choice lists, Understanding Layout Managers: FlowLayout, BorderLayout, GridLayout; Introduction to Event handling using Delegation Event Model.

Introduction to Java Database Connectivity (JDBC): JDBC Architecture, JDBC Drivers, Java.SQL package, Connecting to the Database and performing basic database operation like Insert, Delete, Update and Select.

References:

1. Balaguruswamy, E. : Programming with Java, A Primer, TMH, New Delhi, Latest reprint.
2. Bayross, Ivan : Java 2 by BPB publication
3. Schildt , Herbert : The Complete Reference Java 2, TMH.
4. Arora, Indu : JAVA Programming

Web Application Development using PHP
BCA-16-504

L	T	P	Cr	
6	-	-	3	

External Marks: 65
Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: This course enables students to do web programming using PHP and MySQL.It would enable them to develop websites and other web based applications.

Note :

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

UNIT - I

Introduction to web applications: Client Side Scripting Vs Server Side Scripting, Understanding Web Servers: Local Servers and Remote Servers, Installing WAMP and configuring PHP environment, Static website Vs Dynamic website development, Embedding PHP code in Web Pages

PHP Basics: Tokens, Variables, Variable Scope, Constants, Data Types, number handling in PHP, operands, operators, expressions, operator precedence, comments, echo and Print statement

Control structures: Branching statements: if-else, ternary operator, switch; looping statements: while, do-while, for; file inclusion Statements

UNIT - II

Functions: Function definition, Creating and invoking user-defined functions, Formal parameters versus actual parameters, Function and variable scope, Recursion, Library functions

String Handling: interpolation with curly braces, characters and string indexes, string operators, heredoc, string functions, Formatting Strings, Comparing and searching Strings and substrings

Arrays: PHP Arrays, Creating Arrays, Accessing Array elements, Multidimensional Arrays, Inspecting Arrays, Deleting from Arrays, Iterating with each() and foreach(), Iterative functions: current(), next(), prev(), reset(), end()

UNIT - III

Forms: Working with HTML Form controls and PHP, Super global variables, super global array, importing user input, Accessing user input

Integrating PHP and Database: Connecting to database, Making SQL queries, Executing queries, Fetching data sets, Integrating Forms and Databases**:** Basic form submission to a database, editing data with an HTML form

UNIT - IV

Maintaining User State: Introduction to Cookies, Setting time in a cookie with PHP, Deleting a cookie, creating session cookie, Introduction to sessions, Starting a session, Registering Session variables, working with session variables, Destroying session, passing session Ids , encoding and decoding session variables, increase session expire time, working of session without cookie.

Working with File System: Understanding PHP file permissions, Opening and closing a file, File reading and writing functions, File system and directory functions

References:

1. PHP6 and MySQL Bible, Steve Suehring, Wiley India edition, 2015 reprint
2. PHP: The Complete Reference, "Steven Holzner", Tata McGraw Hill
3. PHP6, Apache, MySQL Web development, Timothy Boronczyk, Wiley India edition
4. Programming PHP, Rasmus Lerdorf, Kevin Tetroi (O'Reilly, ISBN 1565926102).
5. PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites by Robin Nixon O'Reilly Media
6. Core PHP Programming. Leon Atkinson (Prentice Hall, ISBN 0130463469).

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SIXTH SEMESTER

E-Commerce
BCA-16-601

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of this course is to understand the process of electronic commerce and familiarizes students with the technology involved in it.

Note :

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

UNIT - I

An Overview of E-Commerce:
Definitions: E-commerce, E-business, difference between E-commerce and E-business, Problems with Traditional business systems, Aims of E-commerce, Types of E-commerce: B2B, B2C, C2C, B2G, G2H, G2C, Operational & Strategic benefits of E-commerce, Issues & Challenges in E-commerce.
Electronic Data Interchange (EDI): Definition; Traditional versus EDI enabled system for document exchange; Components of EDI: EDI Standards, EDI Software, Communication Networks; EDI Message Structure; EDI Notification Structure; EDI in India; EDI enabled procurement process; Benefits of EDI: Direct Benefits, Strategic Benefits; EDI Implementation issues; Legal Aspects

UNIT - II

Web based E-Commerce: Definition; Need for web based business, Steps in setting up business on Internet: Selection & registration of domain name, Website development : Planning a website, Steps for creating a website, Elements of a webpage, web authoring tools, Hosting a website: Website hosting considerations.
Online Promotion tools & techniques: Getting links to your site, banner advertisements & measuring advertisement effectiveness; Web Traffic Analysis: Hits, View pages, Visits and Other web-reporting tools, various measures, What is Search Engine optimization

UNIT - III

Electronic Payment Systems: E-cash: Purchasing & using of e-cash; Electronic Purses their loading with cash and use; E-cheque payment system; Online Third Party Verified Payment System through Credit & Debit Cards; ATM based cash disbursement system; Electronic Bill Payment System; Inter bank clearing system.

UNIT - IV

Mobile Commerce: Definition, Benefits of Mobile Commerce, Issues in Mobile Commerce, Mobile Commerce Framework
Applications of E-Commerce & Case Studies: Applications of e-commerce, Case studies in Retailing, Banking and e-governance; Cyber Crimes: Types, Cyber Forensics, Cyber crimes and IT Act - 2000.

References:

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1. Bhasker, Bharat: Electronic Commerce: Framework, Technologies and Applications; Tata McGraw- Hill.
2. Bajaj, Kamlesh & Nag, Debjani: E-Commerce-The Cutting Edge of Business; Tata McGraw- Hill.
3. Young, Margaret Levine : The Complete Reference: Internet; Tata McGraw Hill.
4. KalaKota, Ravi & Whinston, Andrew B.: Frontiers of Electronic Commerce; Addison Wesley.
5. Stallings, William: Network Security Essentials: Applications & Standards; Pearson Education.
6. Minoli, Daniel & Minoli, Emma: Web Commerce Technology Handbook; Tata McGraw
   Hill.
7. Murthy CSV: e-Commerce: Concepts, Models, Strategies; Himalayas Publishing House.
8. Kosiur, David: Understanding E-Commerce; Microsoft Press.

Application Development using VB.Net
BCA-16-602

L	T	P	Cr	External Marks: 65
6	-	-	3	Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

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

Note :

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

UNIT - I

Overview of the Visual Studio .NET IDE: Introduction to .NET Framework and the Common Language Runtime, Introduction to Visual tudio.NET IDE: Menu Bar and Tool Bar, Solution Explorer, Toolbox, Using different controls of Toolbox and their commonly used properties and methods: TextBox, Label, Check Box, Radio Button, Button, Frame, List Box, Combo Box, Picture, Image, Shape, Drive, File, directory related controls, Introduction to Menus

UNIT - II

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

Procedures: Introduction, sub Procedures, function procedures, event procedures, commonly used Form events, msgBox function, InputBox function.

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

Control Arrays: Introduction, creating and using Control Arrays

UNIT - III

Writing ASP .NET applications and Deploying ASP .NET Applications: Introduction to ASP.NET, Difference between ASP and ASP.NET, Understanding Web Forms, Using Validation Controls : RequiredFieldValidator,RangeValidator,CompareValidator,RegularExpressionValidator,CustomValidator,ValidationSummary; , Managing State in ASP.NET Web Applications using Session object, Cookie and Query String ,Creating ASP.NET application, Deploying ASP.NET Applications with Windows Installer, Introduction to Web Services.

UNIT - IV

Accessing Data with ADO.NET: Understanding ADO.net, ADO.NET Object model: Connected model and Disconnected model, architecture, components, Understanding Provider classes, using Data Reader to read data from database, Data Adapter and Data sets, Using DataAdapter for Data Navigation and Data Manipulation, connecting to and querying a data source, using Data Grid view control with ADO.NET data sources.

Reference Books:

1. Dave Grundgeiger, Programming Visual Basic .NET, O'Reilly Publisher.
2. Michael McMillan, Object Oriented programming usning Visual Basic.Net, Cambridge University Press.
3. Cameron Wakefield Henk-Evert Sonder Wei Meng Lee, VB.NET Developer's Guide, Global Knowledge, Syngress Publishing.
4. Evangelos Petroutsos, Mastering Visual Basic .NET, SYBEX Publishing
5. Deitel, Visual Basic.NET How to Program, Pearson Education
6. Lowell Mauer, Teach Yourself more Visual Basic.net in 21 days, SAMS

Computer Graphics and Multimedia Applications
BCA-16-603

L	T	P	Cr	
6	-	-	3	**External Marks: 65**
				Internal Marks: 10

Time Duration: 3 Hrs. Number of Lectures : 60

Objective: The objective of the course is to introduce basic computer graphics concepts and algorithms. The student will also learn about essential concepts used in developing multimedia applications.

Note :

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

UNIT - I

Computer Graphics: A Survey of Computer Graphics : Computer Aided Design, Presentation Graphics, Computer art, Entertainment, Education and Training, Visualization, Image Pressing, Graphical User Interfaces.
Overview of Graphics Systems: Video Display Devices, Cathode Ray Tube, CRT monitors, Flat panel displays: Plasma Panel display, Thin-film electroluminescent displays, LED, Liquid Crystal Displays (LCD), Raster Scan Systems, Random Scan Systems. Graphics Monitors and Workstations, Input Devices, Hard-copy devices, Graphics Software.

UNIT - II

Studying the Features and Developing Computer Graphics Using Standard Graphics package Auto CAD: Features and applications of AutoCAD, Interface, System Requirements, The X, Y coordinate system, Dimensioning, Drawing commands, Cleaning Up the drawing, Positioning Commands, Editing Commands, Construction Commands, Display Commands.
Developing Computer Graphics Using 'C': Input-output primitives, setting character and text attributes, changing line styles, Using fill styles to fill images. Use these primitives to develop programs like drawing concentric circles, Ellipses, Sine curves, Histograms, Pie charts and human face.

UNIT - III

Multimedia Applications: What is multimedia, Components of Multimedia, Need of Multimedia, Features of a Multimedia System, Benefits and problems of using Multimedia?
System Components: Multimedia system and a conventional system, Basic System components, Subsystems and functions of a Multimedia computer, Multimedia Add-on Cards. Applications: Multimedia in the Real World, Training and Education, Image

Processing, Multimedia in home and office

Multimedia Platforms: Personal computer as a Multimedia System, Limitations of the early Personal Computer as a Multimedia System, The evolution of MPC, Hardware Platforms, Software Platforms.
Development Tools: Types of development tools, Commercial tools, Stages of Multimedia Application Development.

UNIT - IV

Image: Sources of image, Types of images, Basic editing operations, Introduction to Image Compression: Lossy and Lossless compression, Image file formats.
Audio: Hardware for Audio, Digital Audio, Audio editing operations, MIDI, Audio file formats
Video: Hardware Components of a Video System, introduction to Video compression, MPEG, Video file formats.
Storage for multimedia: magnetic media, Optical media, Compact disk specifications.
Studying features and use of Multimedia authoring tools like Photoshop and Macromedia Director.
Photoshop- Features, Interface, Toolbox, Color models, Layers, Filters
Macromedia Director- Features, Stage, Cast, Score, Control Panel, Sprite, Channels, Text Inspector, Tools for creating cast members

References

1. Hearn and Backer, Computer Graphics, Second Edition, PHI, New Delhi
2. Kanetkar Yashwant, Graphics Under 'C', BPB Publications
3. Judith Jeffcoate, Multimedia in Practice, Technology and Applications, PHI
4. Foley, Vandom, Fenier, Hughes, 'C'; Addison Wesley Publishers
5. Ian R. Sinclair, Multimedia on the PC (with CDROM), BPB Publications
6. Hillman, David, Multimedia Technology and Applications, ITP
7. Vaughan, Tay, Multimedia Making it Work, Osborne Publishers.
8. Ze-Nian, Li.Mark, S. Drew, Fundamentals of Multimedia, Pearson Education