

PANJABUNIVERSITY,CHANDIGARH-160014(INDIA)
(Estd. underthePanjabUniversityActVIIof1947—enacted bytheGovt.ofIndia)

FACULTYOFSCIENCE

SYLLABI

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)
(Under NEP)

(SEMESTER SYSTEM)

(First to Sixth Semester)

FOR

2024 - 2025 Session

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Semester-I

Paper Code	Type of Course	Subject Name	Credits			Marks				
			Th	Pr	Total	Ext (Th)	Int (Th)	Ext (Pr)	Int (Pr)	Total
BCA-101	A-1	Introduction to Web Technologies	2	--	4	45	05	--	--	100
BCA-101P		Practical Based on BCA-101	--	2		--	--	50	-	
BCA-102	B-1	Fundamentals of Mathematical Statistics	4	--	4	90	10	--	--	100
BCA-103	C-1	Problem Solving Through C	2	--	4	45	05	--	--	100
BCA-103P		Practical Based on BCA-103	--	2		--	--	50	-	
BCA-104	MDSC-1	E-Commerce	3	--	3	75	--	--	--	75
BCA-105	AEC-1	English-A	2	--	2	45	05	--	--	50
BCA-106	SEC-1	Computer Fundamentals and Personal Computing Software	--	3	3	--	--	--	--	75
BCA-107	Pbi/HCP	Punjabi / HCP	2	--	2	--	--	--	--	50
BCA-108	VAC-1	Common Basket	2	--	2	--	--	--	--	50
Total Credits					24					600

* One credit of theory lecture is of 1 hour duration and one credit of practical is of 2 hours duration.

A student can opt for a MDSC course subject to following conditions:

- a) The student must not have studied that course in 10+2 level.
- b) The student must not have taken that course as a core subject.

Semester-II

Paper Code	Type of Course	Subject Name	Credits			Marks				
			Th	Pr	Total	Ext (Th)	Int (Th)	Ext (Pr)	Int (Pr)	Total
BCA-201	A-2	Computer Organisation	4	-	4	90	10	--	--	100
BCA-202	B-2	Introduction to Artificial Intelligence and Data Science	2	--	4	45	05	--	--	100
BCA-202P		Practical Based on BCA-202	--	2		--	--	50	--	
BCA-203	C-2	Object Oriented Programming Using C++	2	--	4	45	05	--	--	100
BCA-203P		Practical Based on BCA-203	--	2		--	--	50	--	
BCA-204	MDSC-2	Management Information System	3	-	3	75	--	--	--	75
BCA-205	AEC-2	English-B	2	-	2	--	--	--	--	50
BCA-206	SEC-2	Desktop Publishing using GIMP	--	3	3	-	-	75	--	75
BCA-207	Pbi/HCP	Punjabi / HCP	2	-	2	--	--	-	-	50
BCA-208	VAC-2	Common Basket	2	-	2	--	--	--	--	50
Total Credits					24					600

* One credit of theory lecture is of 1 hour duration and one credit of practical is of 2 hours duration.

A student can opt for a MDSC course subject to following conditions:

- a) The student must not have studied that course in 10+2 level.
- b) The student must not have taken that course as a core subject.

FIRST SEMESTER

Title: Introduction to Web Technologies

Paper Code: BCA-101

L	T	P	Cr
2	-	4	4

Theory External Marks: 45
Theory Internal Marks: 05
Number of Theory Hours : 30
Practical Ext. Marks : 50

Time Duration: 3 Hrs.

Objective: This course enables students to create webpages using HTML, CSS, Javascript and dreamweaver.

Course Outcomes :

After completing this course students will be able to:

- i. Get familiar with the terms related to World Wide Web.
- ii. Use the front end web site developing technologies like HTML and CSS
- iii. Know about the basics of Java Script.
- iv. Use Dreamweaver for creating Web Pages

Note :

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

UNIT-I

Web Terminology: WebServer; WebClient/Browser, Understanding how a Browser communicate with a WebServer, Internet, Intranet, Extranet, WWW, URL

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

UNIT-II

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

Frames: understanding frames, creating frames, Targeting Named Frames

Cascading style sheets (CSS): Style tag, Link tag, Types of CSS: In-Line, Internal, External Forms: Attributes of Form element, Input element: Text Element, Password, Button, Submit Button, Reset Button, The Checkbox, Radio, TextArea, Select and Option

UNIT-III

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

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

UNIT-IV

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

Suggested Reading:

Essential :

1. Wanger & Wyke : JavaScript Unleashed, Pearson, Latest reprint New Delhi.
2. Bayross, Ivan : HTML, DHTML, JAVASCRIPT by BPB, Latest reprint

Further Reading :

3. Joseph Lowery : Adobe Dreamweaver CS6 Bible by Wiley India
4. Kogent Learning Solutions Inc : Dreamweaver CS5 in Simple Steps by Wiley India

Title : Introduction to Web Technologies Lab Based on Paper – BCA-101

Paper Code: BCA-101P

Time Duration: 3 Hrs.

Number of Practical Hours: 60

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

Title : Fundamentals of Mathematical Statistics
Paper Code : BCA -102

L T P Cr
4 - - 4

Theory External Marks: 90
Theory Internal Marks: 10
Number of Theory Hours : 60
Number of Lectures: 100

Time Duration: 3 Hrs.

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

Course Outcomes :

After completing the Course students will be able to

- i) Understand the Basic of Data Collection and Statistical Techniques
- ii) Use and Calculate various measure of central tendency, mean, median, mode, range, deviation.
- iii) Understand the Basic of correlation, measuring techniques and its type.
- iv) Gain an insight into regression analysis, its type and methods of calculation.

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.

Title : Problem Solving Through C
Paper Code: BCA-103

L	T	P	Cr
2	-	4	4

Theory External Marks: 45
Theory Internal Marks: 05

Number of Theory Hours : 30
Practical Ext. Marks : 50

Time Duration: 3 Hrs.

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.

Course Outcomes

On successful completion of the course, students will be able to:

- i. Understand the programming concepts.
- ii. Learn the C programming in practical usage.
- iii. Solve programming problems using C programming language.
- iv. Gain the in depth knowledge of strings, arrays, functions and file handling etc.
- v. Develop applications based on programming concepts.

Note:

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

UNIT - I

Programming Process: Steps in developing of a program, Data Flow Diagram, Algorithm development, Flowchart, 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, The goto 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.

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:

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

Title : Programming Lab Based on Paper – BCA-103 (Problem Solving Through C)

Paper Code: BCA-103P

Time Duration: 3 Hrs.

Number of Practical Hours : 60

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

SECOND SEMESTER

Title : Computer Organisation Paper Code : BCA-201

L T P Cr
4 - - 4

Theory External Marks: 90

Theory Internal Marks: 10

Time Duration: 3 Hrs.

Number of Theory Hours: 60

Objective: This course will enable the student to understand the working of logic gates, boolean laws and the basics of digital logic circuits in computer hardware organization. The course will familiarize the student with design and implementation of electronic circuits used in internal computer hardware architecture for various arithmetic, logic and shift micro-operations of the microprocessor.

Course Outcomes:

On successful completion of the course, students will be able to:

- (i) Understand concept of number systems, binary arithmetic and computer codes with its application in digital design.
- (ii) Learn characteristic and working of different logic gates.
- (iii) Design and simplify logic circuits using boolean algebra and K Maps.
- (iv) Demonstrate the working of various combinational and sequential circuits used as basic building blocks in internal hardware architecture.

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

Number System and its conversion: Binary, Octal, Decimal, Hexadecimal; Binary Arithmetic: addition, subtraction, multiplication, division; 8 Bit Signed Arithmetic: signed magnitude, 1's and 2's complement method; Information Representation: fixed and floating point representation; Computer codes: types of codes, BCD, Excess-3, Gray Code, alphanumeric codes – ASCII, EBCDIC, Error detecting and correcting codes- parity, block parity, checksum, CRC and hamming codes.

UNIT II

Logic gates and their characteristics: fan in/ fan out, propagation delay, power dissipation, noise margin, IC logic families; Basic Boolean Algebra: Boolean laws, duality principle, Demorgan theorem, minterm and maxterms, standard form, conversion to canonical form, simplification of circuit design by solving boolean expressions and Karnaughmap ; Universal Gates: conversion of circuits in terms of NAND or NOR only.

UNIT III

Combinational Circuit Design – Adders: Half adder, Full adder, Serial & n bit Parallel Adder, FA using two HAs; Subtractors: Half and Full Subtractor (n bit FS by 1's and 2's Complement) ; Code Convertors : Decoder and Encoder ; Chip Cascading : 4x16, 5x32 decoder using 2x4 and 3x8 decoders ; Multiplexer, Demultiplexer and their applications.

UNIT IV

Sequential Circuit Design – Flip Flops : Bistable circuit, SR FF, edge triggered with preset & clear, D Type FF, propagation delay, setup & hold time, JK FF, avoidance of race around condition in JK M/S FF, Toggle FF ; Working of Register and Shift Registers : SISO, SIPO, PISO, PIPO ; Counters : Asynchronous n bit counter, Up Down counter, Synchronous counter, applications and comparison.

Suggested Readings:

Essential :

1. M. Morris Mano, 2016. : Digital Logic and Computer Design, Pearson India Education Services Pvt. Ltd.

Further Reading :

2. F. J. Hill, G.R. Peterson, 2009 : Introduction to Switching Theory & Logic Design, John Wiley & Sons Inc.
3. Thomas L. Floyd, 2013 : Digital Fundamentals – A Systems Approach, Pearson International.

Title : Introduction to Artificial Intelligence and Data Science
Paper Code: BCA-202

L	T	P	Cr
2	-	4	4

Theory External Marks: 45
Theory Internal Marks: 05
Number of Theory Hours : 30
Practical Ext. Marks : 50

Time Duration: 3 Hrs.

Objective : The course will help students to learn the basics of Artificial Intelligence and Data Science. It further aims to make them analyze data using spreadsheets.

Course Learning Outcomes

On successful completion of this course, a student will be able to

- i. understand basics of Artificial Intelligence and Data Science.
- ii. analyze data using spreadsheet software.
- iii. visualize, search and summarize the data using spreadsheet.

Note :

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

UNIT - I

Introduction to Artificial Intelligence (AI): Definition, Types of AI, History of AI, Applications of AI in healthcare, education and agriculture, Introduction to key technologies of AI: Machine Learning, Deep Learning, Natural Language Processing (NLP), Computer Vision, Robotics; Ethical issues and Future of AI. Problem Solving: AI problems, Agents and Environments, Structure of Agents.

UNIT - II

Data Science: Introduction to Data Science, evolution and need for Data Science, Types of Data, Data Science Applications in Various Fields, Data Science Life Cycle or Project Stages, Data collection, Data Pre-Processing Overview – Data Cleaning, Data Integration and Transformation, Data Reduction – Data Discretization, Data Storage and management, careers in Data Science

UNIT - III

Managing Data with Spreadsheet Software: Creating a database, sorting & filtering data, custom sorting and advanced filtering, defining and grouping database ranges, applying data tools like data validation, removing duplicates, text to columns, Flash fill; Managing data using Math, statistical, Trigonometric, String/Text, Date and Time, logical and Database functions, Nested functions.

UNIT - IV

Data Visualization, Searching and Summarizing using Spreadsheet Software: Understanding Chart types, Creating Embedded Charts, formatting Charts: Changing Chart types, adding Titles, Legends and Gridlines, Printing Charts, searching data using HLOOKUP and VLOOKUP, summarizing data using pivot table, analyzing data using What-if Analysis: goal seek, scenario manager and data Table.

Suggested Readings:

1. D.Venu Gopal, Data Science and Artificial Intelligence for Beginners Paperback
2. Sudhir Reddy Navar, Introduction to AI/ML and Data Science Paperback
3. C. Raju, Data Science: A Beginner's Guide Paperback
4. Kevin Knight, Elaine Rich, B. Nair - Artificial Intelligence, TMH
5. Manish Nigam, Data Analysis with Excel Paperback, BPB Publications
6. Mali, L. ., Libre Office 5.1 Writer, Calc: Math Formula Book- Vol 1. Notion Press.
7. L. Winston Wayne, Microsoft Excel: Data Analysis & Business Model Paperback

**Title: Introduction to Artificial Intelligence and Data Science Lab Based on
Paper – BCA-202
Paper Code: BCA-202P**

Time Duration: 3 Hrs.

Number of Practical Hours: 60

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

Title : Object Oriented Programming using C++
Paper Code : BCA-203

L	T	P	Cr
2	-	4	4

Theory External Marks: 45
Theory Internal Marks: 05
Number of Theory Hours : 30
Practical Ext. Marks : 50

Time Duration: 3 Hrs.

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.

Course Outcomes :

On successful completion of the course, students will be able to:

- i. Understand the features and importance of object oriented programming concepts.
- ii. Use the concepts like inheritance, polymorphism, and dynamic binding to develop codes.
- iii. Gets better understanding of developing reusable components using C++ programming.
- iv. Develop of large software that needs bottom up and better modular approach.

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 data 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: Concept of Operator Overloading, Overloading unary and binary operators.

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, Hierarchical Inheritance, Hybrid, Nesting of classes.

Polymorphism: Definition, Application and demonstration of Data Abstraction, Encapsulation and Polymorphism, Static and Dynamic Polymorphism, Virtual Functions, 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.

**Title: Lab Based on Paper – BCA -203
(Object Oriented Programming using C++)
Paper Code: BCA – 203P**

Time Duration: 3 Hrs.

Number of Practical Hours: 60

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