

## **Syllabus First Year**

# **FIRST SEMESTER EXAMINATION**

Applicable from Batch Admitted in Academic Session 2024-25 onwards

Course Code: BCA 101T

L T C

Course Name: Programming for Problem Solving using C

4 0 4

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

This course will provide the learners the following:-

1. Understanding of the syntax and the semantics of C programming language
2. Building of their logics for solving a given problem.

**PRE-REQUISITES: None**

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Develop programming skills by learning the fundamentals of structured programming using C Language.
CO2	Design and develop programs using arrays, storage classes, functions and to understand memory management through pointers
CO3	Critically analyze real world problems using structures, unions and develop applications for handling text and binary files.
CO4	Explore the use of command line arguments, string manipulation and standard libraries.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	4	4	__2	-	2	1	__-	-	2
CO2	4	4	4	__2	-	2	1	__-	-	2
CO3	4	4	4	__2	-	2	1	__-	-	2
CO4	4	4	4	__2	-	2	1	__-	-	2

Applicable from Batch Admitted in Academic Session 2024-25 onwards

## **UNIT – I**

**No. of Hours: 12 Chapter/Book Reference: TB1 [1,2,3,4,5,6,7]; TB2 [1,2,3,4,5,6,7]; TB3 [1,2,3,4,5,6]**

C basics: C character set, Identifiers and keywords, Data types, constants, symbolic constants, variable declarations, structure of basic C program, writing and executing the first C program, #include Preprocessor directive, expression statements, compound statements, operators: Arithmetic, Unary, Relational, logical, assignment, shorthand assignment, conditional and bitwise, comma operator.

C control structures: if statement, if...else statement, else if ladder, while, do...while, for, and switch statement, nested control structure, Jump Statements: break, continue, goto statement and exit statement.

## **UNIT II**

**No. of Hours: 13 Chapter/Book Reference: TB1 [8,9,10,13,14]; TB2 [8,9,10,12]; TB3 [7,8, 9,10,11,12]**

C Functions: Functions: declaration, definition & scope, recursion, call by value, call by reference. Preprocessor directive: #define, macros with arguments, nested macros, # and ## operators.

Storage Classes: automatic, external (global), static & registers. Arrays: Arrays (1D, 2D), strings, Pointers: Pointers Basics, pointer arithmetic, Pointer to Pointer, array & pointer relationship, array of pointers, pointers to functions and returning pointers, Dynamic memory allocation.

## **UNIT – III**

**No. of Hours: 11 Chapter/Book Reference: TB1 [17,19,20,21]; TB2 [11,13,14]; TB3 [13,14,16]**

Structures: Structures, unions, Enumeration, passing structure to functions, arrays and structures, typedef, difference between structure and union, self-referential structure(Introduction).

File handling [text (ASCII), binary]: file input output operations, file access modes, file pointers, file Positioning functions (fseek, ftell, rewind etc.)

## **UNIT – IV**

**No. of Hours: 08 Chapter/Book Reference: TB1 [15,22]; TB2 [9]; TB3 [8]**

Standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h., Usage of command line arguments.

### **TEXT BOOKS:**

**TB1.** Yashwant Kanetkar, “Let us C” 17<sup>th</sup> edition, 2020.

**TB2.** E. BalaGuruswamy, “Programming in ANSI C”, 8<sup>th</sup> edition, 2019.

**TB3.** Ashok N. Kamthane, “Programming in C”, Pearson Education, 3<sup>rd</sup> Edition, 2015

### **REFERENCE BOOKS:**

**RB1.** K R Venugopal, Sudeep R Prasad, "Mastering C", McGraw Hill Education; 2nd edition, 2017

**RB2.** V Rajaraman , “Computer Programming in C”, 2nd Edition, 2019

**RB3.** Kernighan and d. Ritchie, “The ANSI C Programming Language”, 2015

**RB4.** Stephen Prata, “C Primer Plus” 6th Edition, 2014

**RB5.** Schaum’s Outline Series, “Programming with C”, 4th Edition, 2018

**RB6.** Reema Thareja, Programming In C" , Oxford University Press, September 2018

**CourseCode: BCA 103T**

**L T C**

**Course Name: Fundamental of Information Technology**

**4 0 4**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

The objectives of this course is to provide the learners:

1. Awareness of evolution of Computers, various types of computers its characteristics, usage, and limitations.
2. Identification of different categories of computers, their peripherals and memory.
3. Knowledge about operating system, their types, MS-Office various software.
4. Understanding of computer network fundamentals and various communication networks.
5. Overview of emerging technologies in IT i.e. AI and Machine Learning, IOT, Data Analytics etc.

**PRE-REQUISITES: None**

**COURSE OUTCOMES(COs):**

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO
CO1	Describe computer with its characteristics, its usage, limitations and benefits, Computer Memories and its type, Software and its type
CO2	Acquire knowledge about Number Systems, various computer languages and operating system DOS
CO3	Attain skills in Application Software used for word processing, spreadsheet and presentation
CO4	Understand network fundamentals and various communication network, Advance trends in IT

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	4	4	__4	-	2	1	__-	-	1
CO2	4	4	4	__2	-	2	-	__-	-	1
CO3	4	4	4	4	-	2	2	__-	-	3
CO4	4	4	4	__4	-	2	2	__-	-	2

Applicable from Batch Admitted in Academic Session 2024-25 onwards

## UNIT-I

**No. of Hours: 12 Chapter/Book Reference: TB1: [Chapters:1,2,7,8,9], TB2:[Chapters:1,2,3,4];RB1[Chapters:6,7], RB3[Chapters:1a,1b,2a,2b,4a,5a], Fundamentals of Computers:**

Definition and Characteristics of Computer System. Computer Generation from First Generation to Fifth Generation. Classifications of Computers: Micro, Mini, Mainframe and super computers

**Computer Hardware:** Major Components of a digital computer, Block Diagram of a computer, Input-output devices, Description of Computer Input Units, Output Units, CPU.

**Computer Memory:** Memory Hierarchy, Primary Memory – RAM and its types, ROM and its types, Secondary Memory, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.

## UNIT-II

**No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters: 10,12,14]; TB2[Chapters:6,7]; RB1[Chapters:6A, 6B, 12A,12B], RB3 [Chapters: 8, 9] Interaction with Computers:**

**Computer Software:** System software: Assemblers, Compilers, Interpreters, linkers, loaders. Application Software: Introduction to MS Office (MS-Word, MS Power point, MS-Excel).

**Operating Systems:** Elementary Operating System concepts, Different types of Operating Systems.

**DOS:** Booting sequence; Concepts of File and Directory, Types of DOS commands.

Computer Programming and Languages: Algorithms, flow chart, decision tables, pseudo code, Low level languages and introduction to high level languages.

## UNIT-III

**No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters:3,5,4]; TB2 [Chapters:5]; RB1[Chapter:2]**

**Computer Number System:** Positional and Non-positional number systems, Binary, Decimal, Octal and Hexadecimal Number Systems and their inter-conversion.

**Binary Arithmetic:**Addition, subtraction, multiplication and division.Use of complement method to represent negative binary numbers, 1's complement, 2's complement, subtraction using 1's complement and 2's complement. Introduction to Binary Coded Decimal (BCD), ASCII Codes, EBCDIC codes.

## UNIT-IV

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters:17,18]; TB2[Chapters:9,10]; RB3[7A,7B,8A,8B]**

**Computer Network & Internet:** Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network Types (LAN, WAN and MAN), Overview of Network devices Hub, Switch, Router, Gateway, Firewall

**Basics of Internet:** Terminologies related to Internet: Protocol, Domain name, IP address, URL, World Wide Web. Introduction to Client-Server Model, Search Engine Applications of Information Technology in various domains

**TEXT BOOKS:**

- TB1.** P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 1992.  
**TB2.** Anita Goel "Computer Fundamentals", Pearson.

**REFERENCE BOOKS:**

- RB1.** B. Ram Computer fundamentals Architecture and Organization, New Age Intl.  
**RB2.** Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing.  
**RB3.** Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.  
**RB4.** Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004.

Course Code: BCA 105T

L T C

Course Name: Web Technologies

4 0 4

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

The objective of this course is to provide the learners the following:

1. Knowledge about the semantic structure of HTML, Javascript, CSS, XML and bootstrap.
2. Ability to compose forms and tables using HTML, Javascript, CSS and Bootstrap.
3. Expertise to design static web pages
4. Skills to create dynamic user interface and perform Client-Side validations using JavaScript

**PRE-REQUISITES: Nil**

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Develop static web pages through HTML, JavaScript, CSS and Bootstrap.
CO2	Implement different constructs and programming techniques provided by JavaScript.
CO3	Adapt HTML, Javascript, CSS and Bootstrap syntax and semantics to build web pages.
CO4	Develop Client-Side Scripts using JavaScript to display the contents dynamically

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	1	4	__4	2	4	2	1	1	4
CO2	4	1	4	__2	2	4	2	1	1	4
CO3	4	1	4	4	2	4	3	1	1	4
CO4	4	1	4	__4	2	4	3	1	1	4

Applicable from Batch Admitted in Academic Session 2024-25 onwards

## **UNIT – I**

**No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters: 1-3]; TB2 [Chapters: 2]; TB3 [Chapters: 1-4]**

**World Wide Web:** Introduction, Web page, Home page, Web site, Static and Dynamic website, Client Server computing concepts. Web Client and Web Server, Web Browser, Client Side and server side Scripting Languages.

**HTML Overview:** Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps.

## **UNIT – II**

**No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters: 4-5]; TB2 [Chapters: 3-5]; TB3 [Chapters: 5-12]; TB4 [Chapters 1-3]**

**Cascading Style Sheet:** Types of Style Sheets – Internal, inline and External style sheets, creating styles, link tag, CSS Properties, CSS Styling, Style Selector- Id, class name and Pseudo Class.

**Bootstrap Basics:** Introduction to Bootstrap, Responsive web design, Linking with Bootstrap, container class, grids, tables, images, buttons, typography classes, jumbotron, glyphicons,

## **UNIT – III**

**No. of Hours:11 Chapter/Book Reference: TB1 [Chapters: 4-5]; TB2 [Chapters: 3-5]; TB3 [Chapters: 5-12]**

**Introduction to Java Script:** Data Types, Control Statements, operators, dialog boxes, Built in and User Defined Functions, Objects in Java Script, Handling Events, basic validations, Document Object Model, Browser Object Model.

## **UNIT – IV**

**No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters]; TB2 [Chapter: 7, 9]; TB3 [Chapter: 1]**

**XML:** Introduction, Features, XML Naming rules, Building block of XML Document, Difference between HTML & XML, XML Parser, DTD's Using XML with HTML and CSS.

**Web Hosting Concepts:** Concept of domain- Physical domain, virtual domain, registering a domain, need of IP addressing, Web Hosting and Publishing Concepts

### **TEXT BOOKS:**

**TB1.** The complete reference HTML and CSS, by Thomas A powell, TMH publication.

**TB2.** Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Pearson

**TB3.** Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition.

**TB4.** Bootstrap: Responsive Web development, Jake Spurlock, O’reilly, First Edition

### **REFERENCE BOOKS:**

**RB1.** HTML Black Book , Stephen Holzner, Wiley Dreamtech.

**RB2.** Rajkamal, “Web Technology”, Tata McGraw-Hill, 2001.

**RB3.** Jeffrey C. Jackson, “Web Technologies : A Computer Science Perspective”, Pearson.

**RB4.** XML How to Program by DeitelDeitel Nieto.

Course Code: BCA 107T

L T C

Course Name: Mathematical Foundation for Computer Science

4 0 4

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

The objectives of this course are to provide the learners with the following:

1. The Knowledge of mathematical probability
2. Understanding of various numerical techniques
3. Familiarity with the Linear Programming and its applications

**PRE-REQUISITES: Basic Concepts of Mathematics**

**COURSE OUTCOMES(COs):**

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO
CO1	Understand the various approaches dealing the data using theory of Probability
CO2	Understand various numerical techniques and apply them to solve real life problems
CO3	Understand various techniques to solve linear simultaneous equations
CO4	Analyse and evaluate the accuracy of common Numerical Methods

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	2	1	2	-	-	1	-	-	-
CO2	-	2	1	2	-	-	1	-	-	-
CO3	-	2	1	2	-	-	1	-	-	-
CO4	-	2	1	2	-	3	1	-	-	-

**UNIT -I**

**No. of Hrs. 12 Chapter/Book Reference: TB2 [chapters 3, 4], TB3 [chapters 2, 3, 4, 5, 6]**

**PROBABILITY:** Introduction, Axiomatic definition of Probability, Addition Theorem, Multiplication theorem, Conditional Probability, Bayes Theorem and its applications

Applicable from Batch Admitted in Academic Session 2024-25 onwards

**PROBABILITY DISTRIBUTIONS:** Random Variable, Probability Mass function, Probability density function, Mathematical Expectations of a Random Variable, Binomial Distribution, Poisson distribution, Normal Distribution.

#### **UNIT -II**

**No. of Hrs. 10 Chapter/Book Reference: TB1 [chapters 2, 3], TB3 [chapters 7, 8, 9]**

**INTERPOLATION:** Operators: Shift; Forward Difference, Backward Difference Operators and their Inter-relation, Interpolation Formulae-Newton's Forward, Backward and Divided Difference Formulae: Lagrange's Formula

**SOLUTIONS OF NONLINEAR EQUATIONS:** Bisection Method, False Position Method, Newton – Raphson Method for Solving Equation Involving One Variable only.

#### **UNIT -III**

**No. of Hrs. 10 Chapter/Book Reference: TB1 [chapters 6], TB3 [chapters 10, 11]**

**SOLUTION OF LINEAR SIMULTANEOUS EQUATIONS:** Gaussian Elimination Method with and without Row Interchange: LU Decomposition: Gauss - Jacobi and Gauss-Seidel Method; Gauss – Jordan Method and to find Inverse of a Matrix by this Method.

#### **UNIT -IV**

**No. of Hrs. 12 Chapter/Book Reference: TB1 [chapters 6], TB3 [chapters 10, 11]**

**NUMERICAL DIFFERENTIATION:** First and Second Order Derivatives at Tabular and Non-Tabular Points,

**NUMERICAL INTEGRATION:** Trapezoidal Rule, Simpsons 1/3 Rule: Error in Each Formula (without proof.)

#### **TEXT BOOKS:**

**TB1.** S.S. Sastry, “Numerical Analysis”; Prentice Hall of India, 1998.

**TB2.** Johnson, R., Miller, I. and Friends, J., Miller and Freund's “Probability and Statistics for Engineers, Pearson Education (2005) 7th Ed.

**TB3.** Singh J P “Probability and Numerical Methods” ANE Books, 4<sup>th</sup> Edition 2019

#### **REFERENCE BOOKS:**

**RB1.** Grewal B S “Numerical Methods in Engineering and Science” Khanna Publishers, 2012

**RB2.** Walpole, Ronald E., Myers, Raymond H., Myers, Sharon L. and, Keying Ye, Probability and Statistics for Engineers and Scientists, Pearson Education (2007) 8th Ed.

**RB3.** Gupta S C, Kapoor V K “Fundamental of Mathematical Statistics” Sultan Chand and Sons 11th edition 2002

**RB4.** Manmohan, Gupta, P K, KantiSwarup “Introduction to Management science operations research” Sultan Chand and Sons

**Course Code: BCA 141T**  
**Course Name: Writing Skills**

**L T C**  
**3 0 3**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

This course will provide the learners the following:

1. Understanding the correct use of English Language.
2. The student will improve in oral as well as written communication skills.

**PRE-REQUISITES: Nil**

**COURSE OUTCOMES(COs):**

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO
CO1	The student will become familiar with the basics of communication and its importance in the organizational world.
CO2	To improve the business writing skills also will become well aware how to write effective resume to enter the global world.
CO3	To improve the listening skills by knowing well how to negotiate and give effective presentations.
CO4	To make use of effective business language and give a professional look to oneself.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	2	-	2	1	-	1	2	1	2
CO2	-	2	-	2	1	-	1	2	1	2
CO3	-	2	-	2	1	-	1	2	1	2
CO4	-	2	-	2	1	3	1	2	1	2

**UNIT-I**

**No. of Hours: 10 Chapter/Book Reference: TB1, TB2, TB3, TB4**

Applicable from Batch Admitted in Academic Session 2024-25 onwards

Overview of Technical Writing: Definition and Nature of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing. Sentence, Phrase, Kinds of sentences, Parts of sentence and parts of speech

## **UNIT-II**

**No. of Hours: 12 Chapter/Book Reference: TB1, TB2, TB3**

Note Making, Notice, E-mail Writing. Writing Letters: Business letters, Persuasive letters- Sales letters and complaint letters

Office memorandum, Good news and bad news letters

Report Writing: Definition & importance; categories of reports, Elements of a formal report, style and formatting in report

## **UNIT-III**

**No. of Hours: 12 Chapter/Book Reference: TB1, TB2, TB3, TB4**

Special Technical Documents Writing: Project synopsis and report writing, Scientific Article and Research Paper writing, Dissertation writing: Features, Preparation and Elements

Technical Proposal Writing: Purpose, Types, characteristics and structure

## **UNIT-IV**

**No. of Hours: 10 Chapter/Book Reference: TB3, RB1, RB3**

Preparing for Job Application, Components of a Formal Application Letter, Formats and Types of official, employment, Resume vs Bio Data, Profile, CV and others, Types of resume, Writing effective resume for employment, Model Letter of Application (Cover Letter) with Resume, Emails, Blog Writing, Memos (Types of Memos) and other recent communication types

## **TEXTBOOKS:**

**TB1.** Kavita Tyagi and Padma Misra , “Advanced Technical Communication”, PHI, 2011

**TB2.** P.D.Chaturvedi and Mukesh Chaturvedi, “Business Communication – Concepts, Cases and Applications”, Pearson, second edition.

**TB3.** Rayudu, “C.S- Communication”, Himalaya Publishing House, 1994.

**TB4.** Asha Kaul , “Business Communication”, PHI, second edition.

**TB5.** Raymond Murphy, “Essential English Grammar- A self study reference and practice

## **REFERENCES:**

**RB1.** Book for elementary students of English” , Cambridge University Press, second edition.

**RB2.** Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.

**RB3.** Kavita Tyagi and Padma Misra , “Basic Technical Communication”, PHI, 2011.

**RB4.** Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, “Effective Business Communication”, McGraw Hill, seventh edition.

**Course Code: BCA 191T**  
**CourseName: Understanding India**

**L T C**  
**2 0 2**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

- i. To have an understanding on history and culture of ancient India.
- ii. The students will be acquainted with the literature, philosophy, art and architectural developments in India during the period concerned.
- iii. To understand ancient India Knowledge system
- iv. The students will also get to know about their constitutional rights and duties.

**PRE-REQUISITES: Nil**

**COURSE OUTCOMES(COs):**

After completion of this course, the learners will be

CO#	Detailed Statement of the CO
CO1	Familiar with the History and culture of Ancient India
CO2	Understanding the ancient Indian literature
CO3	Having awareness of the ancient knowledge system of India
CO4	Aware of Basic features of our constitution

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	-	-	-	-	-	-	3	3	-
CO2	-	-	-	-	-	-	-	3	3	-
CO3	-	-	-	-	-	-	-	3	3	-
CO4	-	-	1	-	-	3	-	3	3	-

**UNIT I**

Applicable from Batch Admitted in Academic Session 2024-25 onwards

Introducing India : The People of India: demography and languages, The Name of our Country: Jambudvīpa, Sindhu (Indus), Inde, Hind, Hindustan, BharatIndia  
The idea of Bharatvarsha; Ancient Indian literatureSanskrit, Pali, Prakrit, Tamil Religions and philosophies of ancient India-Vedic, Buddhism, Jainism

#### **UNIT II**

Science, Technology and Medicine: A general survey of the progress of science,technology and medicine in ancient India

The Knowledge System of India:Traditional Knowledge System: Gurukuls, Pathsalas, Tols, Maktabas, Madrasas

Beginnings of Modern Education: Main features of British Government's educational policies

Growth of higher and technical education in India

#### **UNIT III**

The Indian Economy :Features of the Indian economy from past to present (agriculture, industry and trade)

#### **UNIT IV**

The Making of Contemporary India The struggle for Independence (1885-1947)

Basic features of Indian constitution: Basic Structure, Doctrine, Fundamental rights, and duties, Directive principles,Federal Structure, Independence of Judiciary and theParliamentary system

#### **TEXT BOOKS:**

**TB1.** A.L. Basham,The Wonder that Was India, Picador India,1971

**TB2.** R.S.Sharma,India'sAncientPast, NewDelhi, OUP, 2007

**TB3.** Upinder Singh, The History of the Ancient and Early Medieval India, Pearson, 2008

**TB4.** Satish Chandra, History of Medieval India, Arihant Publication, 2020.

#### **REFERENCES:**

**RB1.** Durga Das Basu, Introduction to the Constitution of India, Lexis Nexis, 2018 2003

**RB2.** Tirthankar Ray, The Economic History of India 1857-1947, OUP, 2006

**RB3.** Vijay Joshi and I.M.D. Little, India's Economic Reforms, 1991-2001, OUP, 1996

**RB4.** Dr. Prabhakiran Jain & R. Sharma, Understanding India, Mahavir Publication

**Course Code: BCA 181T**

**L TC**

**Course Name: Bridge Course in Mathematics**

**2 - -**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**Aim:** To build mathematical aptitude of the students for understanding the basic concepts of core courses of mathematics of the programme.

**LEARNING OBJECTIVES:**

The objectives of this course is to provide the learners

- The knowledge about the matrices, determinants and limits.
- Familiarity with basic concepts of differential and integral calculus.

**COURSE OUTCOMES(COs):**

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Understand the various approaches dealing the data using theory of matrices
CO2	Understand and apply the concepts of determinants
CO3	Understand the concept of calculus such as limit, continuity and differentiability.
CO4	Appraise and determine the correct logic and solutions for any given real world problem using application of integration& integral calculus.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	2	-	2	1	-	1	2	1	2
CO2	-	2	-	2	1	-	1	2	1	2
CO3	-	2	-	2	1	-	1	2	1	2
CO4	-	2	-	2	1	3	1	2	1	2

Applicable from Batch Admitted in Academic Session 2024-25 onwards

## **UNIT-I**

**MATRICES:** Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition, multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication, invertible matrix.

**DETERMINANTS:** Determinant of a square matrix (up to  $3 \times 3$  matrices), properties of determinants, minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix, solving system of equations using matrix method, Cramer rule (only two and three unknown).

## **UNIT-II**

**INTRODUCTION TO TRIGONOMETRIC FUNCTIONS:** Degree and radian measurements of an angle, Quadrant system, allied angles, and Simple problems based: on Sum/difference of angles of t functions, C and D Formulae, t functions of multiple angles.

## **UNIT-III**

**LIMITS, CONTINUITY AND DIFFERENTIABILITY:** : Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity and differentiability, derivative of composite functions, chain rule, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms.

## **UNIT-IV**

**INTEGRATION:** Integral as Limit of Sum, Riemann Sum, Fundamental Theorem of Calculus, Indefinite Integrals, Simple problems based on Methods of Integration Substitution, By Parts, Partial Fractions, Integration of Algebraic and transcendental Functions.

## **TEXT BOOKS:**

**TB1.** Mathur A B, Jaggi V P “A Textbook of Engineering Mathematics” Khanna Publishers,

**TB2.** Dass H K “Applied Mathematics for polytechnics” CBS publishers

**TB3.** Singh J P “Calculus” ANE Books

## **REFERENCE BOOKS:**

**RB1.** Kresyig E., “Advanced Engineering Mathematics”, 5th Edition, John Wiley & Sons

**RB2.** H.K. Dass, “Advanced Engineering Mathematics”, S. Chand & Company

**RB3.** Grewal B S, “Elementary Engineering Mathematics”

**Course Code: BCA 101P**

**L P C**

**Course Name: Programming for Problem Solving using C Lab**

0 2 2

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 101T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

**Course Code: BCA 103P**

**L P C**

**Course Name: Fundamentals of Information Technology Lab**

0 2 2

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 103T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

**Course Code: BCA 105P**

**L P C**

**Course Name: Web Technologies Lab**

0 2 2

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 105T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

# **BCA SECOND SEMESTER SYLLABUS**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

The paper aims to introduce the concept of Back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database. The objective of this course is to provide the learners expertise in the following:

1. Understanding of the requirement of database management System for storing data and its advantages over file management system.
2. Designing the database conceptually, physically and finally implementing the creation of database for any application.
3. Learning of queries in SQL for creating database and performing various operations for manipulating data in the database.
4. Knowledge of database utilities i.e. backup, recovery, transaction processing.

**PREREQUISITE:** Basic knowledge of data storage and file management system

**COURSE OUTCOMES (COS):**

After completion of this course, the learners will be able to: -

<b>CO #</b>	<b>Detailed Statement of the CO</b>
CO1	Understand the DBMS concepts with detailed architecture, characteristics. Describe different database languages and environment and learn various data models, along with the related terminologies
CO2	Explore Structure Query Language, a brief on NOSQL, Query By Example. Also understand the overview of SQL, and try to implement DDL, DML and DCL along with operators, use of joins, nested query, use of views and Indexes Discuss Integrity Constraints
CO3	Describe Relational Data Model, explain Codd's Rules, Relational Algebra, Set theory operations and the concept of functional dependencies and normalization

CO4	Acquire Knowledge about Transaction Processing, concurrency problems, and its controlling techniques, Database backup and recovery and security.
-----	--

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	1	4	4	2	4	2	1	1	4
CO2	4	1	4	2	2	4	2	1	1	4
CO3	4	1	4	4	2	4	3	1	1	4
CO4	4	1	4	4	2	4	3	1	1	4

### UNIT-I

[No. of Hrs.: 10] Chapter/Book Reference: TB1 [Chapter 2]; TB2 [Chapter 1]

**Introduction:** An overview of database management system, Characteristics of database approach, DBMS architecture, client/server, data Models, Introduction to Distributed Data processing, schema and instances, data independence,

**Data Modelling using Entity Relationship Model:** Basic introduction about the terminologies like Entity, Entity types, entity set, notation for ER diagram, attributes and keys, Types of attributes (composite, derived and multivalued attributes) and keys (Super Key, candidate key, primary key), relationships, relation types, weak entities, enhanced E-R, specialization and generalization.

### UNIT – II

[No. of Hrs.: 13] Chapter/Book Reference: TB1 [Chapter 8]; TB2 [Chapter 2];

**Introduction to SQL:** Overview, Characteristics of SQL. Advantage of SQL, SQL data types and literals.

**Types of SQL commands:** DDL, DML, DCL. Basic SQL Queries.

**Logical operators:** BETWEEN, IN, AND, OR and NOT

**Null Values:** Disallowing Null Values, Comparisons Using Null Values

**Integrity constraints:** Primary Key, Not NULL, Unique, Check, Referential key

Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses,

**Joins:** Inner joins, Outer Joins, Left outer, Right outer, full outer joins.

Overview of other SQL Objects: Views, Sequences, Indexes, Triggers and stored procedure.

### UNIT – III

[No. of Hrs.: 12] Chapter/Book Reference: TB1 [Chapter 7 & 15]; TB2 [Chapter 3];

**Relational Data Models:** Relational model terminology domains, Attributes, Tuples, Relations, characteristics of relations, relational constraints domain constraints, key constraints and constraints on null, relational DB schema. Codd's Rules

**Relational algebra:** Basic operations selection and projection,

**Set Theoretic operations:** Union, Intersection, set difference and division

**Join operations:** Inner, Outer, Left outer, Right outer, and full outer join

**ER to relational mapping:** Steps to map ER diagram to relational schema

**Data Normalization:** Functional dependencies, Armstrong's inference rule, & Normalization (Upto BCNF)

### UNIT – IV

[No. of Hrs.: 9] Chapter/Book Reference: TB1 [Chapter 19 & 20]; TB2 [Chapter 5];

Applicable from Batch Admitted in Academic Session 2024-25 onwards

**Transaction Processing:** Definition of Transaction, Desirable ACID properties

**Database recovery and Database Security:** System failure, Backup & recovery Techniques, Authentication, Authorization.

**Overview of Query by Language, NoSql databases**

**TEXT BOOKS:**

**TB1.** R. Elmarsri and SB Navathe, “Fundamentals of Database Systems”, Pearson, 5th Ed.

**TB2.** Singh S.K., “Database System Concepts, design and application”, Pearson Education

[TB3] **TB3.** Ramakrishnan and Gherke, “Database Management Systems”, TMH.

**TB4.** Bipin Desai, “An Introduction to Database Systems”, Galgotia Publications, 1991.

**REFERENCE BOOKS:**

**RB1.** Abraham Silberschatz, Henry Korth, S. Sudarshan, “Database Systems Concepts”, 6<sup>th</sup> Edition, McGraw Hill, 2010.

**RB2.** Jim Melton, Alan Simon, “Understanding the new SQL: A complete Guide”, Morgan Kaufmann Publishers, 1993.

**RB3.** A. K. Majumdar, P. Battacharya, “Database Management Systems”, TMH, 2017.

**RB4.** Bipin Desai, “An Introduction to Database Systems”, Galgotia Publications, 1991

**Course Code: BCA 104T**  
**Course Name: Object Oriented Programming using Java**

**L T C**  
**4 0 4**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. Learn how to implement Object Oriented concepts through Java.
2. Identify and apply the Java thread model to program Java applications.
3. Develop GUI applications using Java swings

**PRE-REQUISITES:**

1. Programming fundamental
2. Object-Oriented concepts

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Illustrate the Object-Oriented paradigm and Java language constructs
CO2	To inculcate concepts of inheritance to create new classes from existing ones and design the Classes needed given a problem specification. To familiarize the concepts of packages and interfaces.
CO3	To manage input output using console and files
CO4	To facilitate students in handling exceptions and defining their own exceptions. To apply the Java Thread model to develop multithreading applications.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	4	4	__2	-	2	1	__-	-	2
CO2	4	4	4	__2	-	2	1	__-	-	2
CO3	4	4	4	__2	-	2	1	__-	-	2
CO4	4	4	4	__2	-	2	1	__-	-	2

## UNIT-I

**No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 1, 2, 3, 5, 6], TB2[Chapters - 2, 3, 4, 5, 6, 7, 8]**

**Object Oriented Paradigm:** Procedural vs. object-oriented development, basic concepts of object-oriented programming, applications and benefits of OOP

**Java Basics:** Java as Object-oriented Programming Language History of Java, Features of Java, Difference between Java and C++, Java Architecture (JDK, JVM, JRE), Java Tokens: Basics of Java programming: Data types, Literals, Variables, Scope and lifetime of variables, Operators. Control Structures including selection, Looping, Arrays.

## UNIT – II

**No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 7, 8, 9], TB2[Chapters - 9, 10, 11]**

**Introducing Classes:** Creating a Class: properties, methods and constructors. Object Access modifiers, this keyword, Static (variable, method, block), final keyword, String class and methods.

**Inheritance:** Types, Super keyword, method overriding, covariant return type, abstract class.

**Interfaces and Packages:** Creation and implementing an interface, difference between abstract class and interface, Packages, and importing a package.

**Polymorphism :**Dynamic binding, Generic programming, Casting objects, Instance of operator, Method Overloading

## UNIT – III

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 11, 12], TB2[Chapters - 13]**

**Using I/O:** Elementary concepts of Input/Output, using the byte streams, reading and writing using byte streams, automatically closing a file, using the character-based streams, File I/O using character streams (using a File Writer and using a File Reader)

## UNIT – IV

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 17, 18]**

**Exception Handling:** Exception Class, built-in checked and unchecked exceptions, user-defined exceptions, use of try, catch, throw, throws, finally

**Multi-threaded programming:** Multithreading fundamentals, Thread class, and Runnable interface, the life cycle of thread, creation of single and multiple threads, implementation of Thread methods, Synchronization (using Synchronized methods, synchronized statement).

## TEXT BOOKS:

**TB1.** Herbert Schildt, “Java 2 -The Complete Reference” – Tata McGraw Hill Education Private Limited, 2010

**TB2.** Trilochan Tarai, “Java Core Concepts and Applications”, I.K. International Publishing house pvt. Ltd., 2015

## REFERENCE BOOKS:

**RB1.** E.Balaguruswamy, “Programming with Java A Primer”, McGraw Hill Education Private Limited, 5<sup>th</sup> Edition, 2015.

**RB2.** Herbert Schildt, Dale Skrien, “Java Fundamentals A Comprehensive Introduction” – Tata McGraw Hill Education Private Limited, 2013

**RB3.** Cay S. Horstmann, “Core Java Volume 1 – Fundamentals”, 10<sup>th</sup> edition, Pearson, 2017

**RB4.** Ken Arnold, Davis Holmes, James Gosling, Prakash Goteti, “The Java Programming Language”, 3<sup>rd</sup> edition, Pearson, 2008.

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be provided expertise in

1. Understanding of the basic concepts of data structures and their operations like, insertion, deletion, searching and sorting
2. Design algorithms and pseudo codes of various linear and non-linear data structures

**PRE-REQUISITES:**

1. C Programming Skills
2. Discrete Mathematics

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO
CO1	Familiarize the basics of data structures and algorithms.
CO2	Understand and apply linear and nonlinear data structures and their operations.
CO3	Compare and implement searching, sorting and hashing techniques.
CO4	Appraise and determine the correct data structure for any given real world problem.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	1	4	__4	2	4	2	1	1	4
CO2	4	1	4	__2	2	4	2	1	1	4
CO3	4	1	4	4	2	4	3	1	1	4
CO4	4	1	4	__4	2	4	3	1	1	4

## UNIT – I

**No. of Hours: 14 Chapter / Book Reference: TB1 [Chapters 1, 4, 9], TB2 [Chapters 1, 6, 7], TB3 [Chapters 1, 2,6,10]**

**Linear Data Structures- Static:** Introduction to Algorithms- Attributes, Design Techniques, Time Space Trade Off, Data Structures, Classification and Operations of Data Structures.

**Arrays:** Single Dimension, Two-Dimension and Introduction to Multi Dimensions, Memory Representation, Address Calculation, Sparse Matrices- Types, Representation.

**Searching and Sorting:** Linear and Binary Search, Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Elementary Comparison of Searching and Sorting Algorithms.

**Hashing:** Hash Table, Hash Functions, and Collision Resolution.

## UNIT – II

**No. of Hours: 10 Chapter / Book Reference: TB1 [Chapter 5], TB2 [Chapter 4], TB3 [Chapter 3]**

**Linear Data Structures- Dynamic**

**Introduction:** Dynamic Memory Allocation, Dynamic Memory versus Static Memory Allocation.

**Linked List Types:** Singly Linked List, Circular Linked List, Doubly Linked List.

**Operations:** Creation, Insertion, Deletion, Modification, Searching, Sorting, Reversing, and Merging.

## UNIT – III

**No. of Hours: 10 Chapter / Book Reference: TB1 [Chapter 6], TB2 [Chapters 2, 4], TB3 [Chapters 4, 5]**

**Abstract Data Types:**

**Stacks:** Introduction, Static and Dynamic Implementation, Operations, Applications- Evaluation and Conversion between Polish and Reverse Polish Notations.

**Queues:** Introduction, Static and Dynamic Implementation, Operations, Types- Linear Queue, Circular Queue, Doubly Ended Queue.

## UNIT – IV

**No. of Hours: 10 Chapter / Book Reference: TB1 [Chapters 7, 8], TB2 [Chapters 5, 8], TB3 Chapters 7, 8]**

**Non Linear Data Structures:**

**Introduction to Graphs:** Notations & Terminologies, Representation of Graphs- Adjacency Matrix, Incidence Matrix and Linked Representation.

**Trees:** Notations & Terminologies, Memory Representation, Binary Trees Types- Complete, Full, Strict, Expression Binary Tree, Tree Traversals (Recursive), Binary Search Tree and Basic Operations

**Introduction and Creation (Excluding Implementation):** AVL Tree, Heap Tree, M- Way Tree, and B Tree.

## TEXT BOOKS:

**TB1.** Schaum's Outline Series, "Data Structures", TMH, Special Indian Ed., Seventeenth Reprint, 2014.

**TB2.** Y. Langsam, M. J. Augenstein and A.M. Tanenebaum, "Data Structures using C and C++", Pearson Education India, Second Edition, 2015.

**TB3.** D. Samanta, "Classic Data Structures", PHI, Second Edition, 2009.

**REFERENCE BOOKS:**

- RB1.** Ashok N kamthane “Introduction to Data Structures in C”, Pearson
- RB2.** E. Horowitz and S. Sahni, “Fundamentals of Data Structures in C”. Universities Press,
- RB3.** D. Malhotra and N. Malhotra, “Data Structures and Program Design using C“, Laxmi Publications, Indian adapted edition from Mercury Learning and Information-USA,
- RB4.** Y. Kanetkar“ Data Structures through C”, BPB Publication,
- RB5.** R.F Gilberg, and B AFrouzan- “Data Structures: A Pseudocode Approach with C”, Thomson Learning,
- RB6.** A. K. Rath, and A.K. Jagadev, “Data Structures and Program Design Using C”, Scitech Publications,

**Course Code: BCA 108T**

**L T C**

**Course Name: Software Engineering**

**4 0 4**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

The paper aims to understand the importance, limitations and challenges of processes involved in software development. In this course, the learners will be able to develop expertise related to the following:

1. To gain knowledge of various software models.
2. To gain knowledge of various software design activities.
3. To learn cost estimation, software testing, Maintenance and debugging.

**PRE-REQUISITES:**

Nil

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Instantiating into the process of designing, coding and testing a software module. Implementing Software Development Life Cycle(SDLC) to develop a software module
CO2	Organizing a software product along with its complete documentation.
CO3	To analyze the use of techniques, skills and modern engineering tools necessary for software development.
CO4	Organizing a complete software module according to SDLC

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	2	4	__4	1	4	1	1	1	4
CO2	4	2	4	__2	1	4	1	1	1	4
CO3	4	2	4	4	1	4	1	1	1	4
CO4	4	2	4	__4	1	4	3	2	1	4

Applicable from Batch Admitted in Academic Session 2024-25 onwards

## **UNIT – I**

**No. of Hours: 12** Chapter/Book Reference: TB1 [Chapters - 1, 3], TB2 [Chapters - 3, 5]

**Introduction of software engineering:** Software Crisis, Software life cycle models, Waterfall, Prototype, Spiral Models, Agile model, Iterative Enhancement model.

**Software Requirements analysis & specifications:** Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirement analysis using (DFD, use-case, sequence and class diagram (with case studies), ER Diagrams, Requirements documentation: SRS, Characteristics & organization of SRS

## **UNIT – II**

**No. of Hours: 10** Chapter/Book Reference: TB1 [Chapter - 1, 4]

**Software Project Planning:** Software Metrics-Definition and Need, Types of Metrics-Product, Process and Project Metrics, Size Estimation like lines of Code & Function Count, Halstead Software Science measure, Cost Estimation: Need, Models COCOMO: Basic model, Intermediate model

**Risk Management:** Software Risks, Types of risk, risk management activities: risk assessment, risk control.

## **UNIT – III**

**No. of Hours: 10** Chapter/Book Reference: TB1 [Chapter - 5, 6], TB2 [Chapter - 24]

**Software Design:** Cohesion & Coupling, Classification of Cohesiveness & Coupling,

**Quality management:** Quality concept, software quality assurance, Total Quality Management (TQM), software review, software inspection

**Software Implementation:** Structured coding techniques, coding style, Standards and guidelines, documentation guidelines. Reverse Engineering, Software Re-engineering, Configuration Management.

## **UNIT – IV**

**No. of Hours: 12** Chapter/Book Reference: TB1 [Chapter 8, 9], TB2 [Chapter 8]

**Software Testing:** Testing Process, Levels of Testing: Unit testing, Integration testing and system testing. Types of Testing: Manual testing, Automation Testing. Methods of Testing: Black box, White box and Grey Box Testing. Validation, Verification, Alpha-Beta testing, Acceptance testing, Functional Testing and its types, Structural Testing Difference between: Testing and Debugging

**Software Maintenance:** Management of Maintenance, The Maintenance Process and Types of maintenance: Preventive, Perceptive, Adaptive and Corrective Maintenance.

## **TEXT BOOKS:**

**TB1.** K. K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International, 2005.

**TB2.** I. Sommerville, “Software Engineering”, 9th Edition, Pearson Edu.

## **REFERENCE BOOKS:**

**RB1.** Jibitesh Mishra and Ashok Mohanty, “Software Engineering”, Pearson

**RB2.** R. S. Pressman, “Software Engineering – A practitioner’s approach”, 5th Ed., McGraw Hill

**RB3.** James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach”, John Wiley & Sons

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

This course will provide the learners the following:

To know about various aspects of soft skills and learn ways to develop personality

1. Understand the importance and type of communication in personal and professional environment.
2. To provide insight into much needed technical and non-technical qualities in career planning.
3. Learn about Leadership, team building, decision making and stress management

**PRE-REQUISITES: Nil**

**COURSE OUTCOMES(COs):**

CO#	Detailed Statement of the CO
CO1	The student will become familiar with the basics of soft Skills and its importance in their career and life
CO2	To improve the business communication skills
CO3	To improve the listening skills by knowing well how to negotiate and give effective presentations.
CO4	To make use of effective business language and give a professional look to oneself.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	2	-	2	1	-	1	2	1	2
CO2	-	2	-	2	1	-	1	2	1	2
CO3	-	2	-	2	1	-	1	2	1	2
CO4	-	2	-	2	1	3	1	2	1	2

## **UNIT-I**

**No. of Hours: 10 Chapter/Book Reference: TB1, TB2, TB3, TB4**

**Foundations Of Soft Skills:** Soft Skills as Essential Life Skills, Meaning, Definition, Types, and Scope of Soft Skills, Prospects and Significance of Developing Soft Skills, Differentiating Skills, Knowledge, Attitudes, and Beliefs, Understanding Technical, Human, and Conceptual Skills

**Soft Skills in Career Prospects:** Exploring the Role of Soft Skills in Career Success, Implications and Benefits of Incorporating Soft Skills, Coordinating Conceptual and Practical Aspects of Soft Skill Development, Human Values and Work Ethics as Integral Soft Skills

## **UNIT-II**

**No. of Hours: 10 Chapter/Book Reference: TB1, TB2, TB3**

**Communication And Interpersonal Proficiency:**

Effective Communication: Meaning and Significance of Effective Communication, Elements of the Communication Process-Verbal and Non-verbal Communication Skills

**Overcoming Communication Barriers:** Identifying Barriers and Misinterpretations, Strategies to Overcome Communication Challenges, Importance of Active Listening, Conflict Resolution and Negotiation, Problem Solving and Conflict Handling Techniques, Applying Negotiation skills for Effective Outcomes, Role of Communication in Conflict Resolution

## **UNIT-III**

**No. of Hours: 10 Chapter/Book Reference: TB1, TB2, TB3, TB4**

**Professional Skills Development:**

**Group Discussion:** Introduction, Definitions, Purpose and Types of Group Discussions Characteristics of Effective Group Discussions Dos and Don'ts of participating in Group Discussion

**Interview Skills:** Interview Concept and Definition, Purpose/Objective of Interview, Types of Interviews Guidelines for Successful Interview Preparation and Execution

**Presentation Skills Importance** of Effective Presentations, Essentials for Successful Presentations, Utilizing PowerPoint for Impactful Presentations

## **UNIT-IV**

**No. of Hours: 10 Chapter/Book Reference: TB3, RB1, RB3**

**Personal And Wellness Skills:** Self-Development and Awareness, Exploring the Role of the Self in Personal Growth, Stages of Development and Sigmund Freud's Layers of the Self Emotional Intelligence and Critical Thinking: Importance of Emotional Intelligence, Self-Awareness, Self-Regulation, Motivation

Empathy : Utilizing Critical Thinking for Problem Solving

Stress and Time Management: Recognizing Stress- Signs, Symptoms, and Impact Strategies for Stress Management and Prevention Effective Time Management Techniques

## **TEXTBOOKS:**

**TB1.** Alex, Dr. K, Soft Skills Know Yourself and Know The World, S Chand & Company.

**TB2.** Kavita Tyagi and Padma Misra, "Advanced Technical Communication", PHI,

**TB3.** Personality Development and Soft Skills, Barun K. Mitra, Oxford Higher Education

**TB4.** Goleman, D., Emotional intelligence: Why it can matter more than IQ, Bantam Books.

**TB5.** Nelson-Jones, R., Life skills, A Handbook, Trowbridge, Wilts: Detesios Ltd.

## **REFERENCES:**

**RB1.** Kaul, Asha. (2009). Business Communication (2nd edition) PHI Learning..

- RB2.** Tuhovsky, Ian. Communication Skills Training Rupa Publication India.
- RB3.** Kavita Tyagi and Padma Misra , “Basic Technical Communication”, PHI, 2011.
- RB4.** Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, “Effective Business 3.

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 10 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. Development of critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
2. Acquisition of values and attitudes towards understanding complex environmental economic- social challenges, and active participation in solving current environmental problems and preventing the future ones.
3. Encouraging adoption of sustainability as a practice in life, society, and industry.

**PRE-REQUISITES:** Basic awareness about the natural environment.

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to:

CO#	Detailed Statement of the CO
CO1	Gain in-depth knowledge on natural processes and resources that sustain life and govern economy.
CO2	Understand the consequences of human actions on the web of life, global economy, and quality of human life.
CO3	Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
CO4	Acquire values and attitudes towards understanding complex environmental economic-social challenges, and active participation in solving current environmental problems and preventing the future ones.

Course Outcomes	Program Outcomes (Scale – 1:very low,2: low,3:medium,4:high)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	-	1	2	1	2	-	2	4	2
CO2	-	-	1	2	1	2	-	1	4	2
CO3	-	-	3	2	1	2	-	1	4	1
CO4	-	-	1	2	1	3	-	1	4	2

### UNIT–I

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters 1, 6]; TB2 [Chapters 8, 11, 25]; TB3 [Chapters 1, 35]**

#### **Introduction to Environmental Studies**

Multidisciplinary nature of environmental studies; components of environment: atmosphere, hydrosphere, lithosphere, and biosphere.

Scope and importance; Concept of sustainability and sustainable development

Emergence of environmental issues: Climate change, Global warming, Ozone layer depletion, Acid rain etc.

International agreements and programmer: Earth Summit, UNFCCC, Montreal and Kyoto protocols, Convention on Biological Diversity(CBD), Ramsar convention, The Chemical Weapons Convention (CWC), UNEP, CITES, etc

### UNIT–II

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters 2, 3]; TB2 [Chapters 2, 15, 16, 17]; TB3 [Chapters 2, 7, 11, 12]**

#### **Ecosystems and Natural Resources**

Definition and concept of Ecosystem

Structure of ecosystem (biotic and abiotic components); Functions of Ecosystem: Physical (energy flow), Biological (food chains, food web, ecological succession), ecological pyramids and homeostasis.

Types of Ecosystems: Tundra, Forest, Grassland, Desert, Aquatic (ponds, streams, lakes, rivers, oceans, estuaries); importance and threats with relevant examples from India

Ecosystem services (Provisioning, Regulating, Cultural, and Supporting); Ecosystem preservation and conservation strategies; Basics of Ecosystem restoration

Energy resources: Renewable and non-renewable energy sources; Use of alternate energy sources; Growing energy needs; Energy contents of coal, petroleum, natural gas and bio gas; Agro-residues as a biomass energy source

### UNIT–III

**No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter 4]; TB2 [Chapters 4, 5, 6]; TB3 [Chapters 22, 23, 24]**

#### **Biodiversity and Conservation**

Definition of Biodiversity; Levels of biological diversity: genetic, species and ecosystem diversity

India as a mega-biodiversity nation; Biogeographic zones of India; Biodiversity hotspots; Endemic and endangered species of India; IUCN Red list criteria and categories

Value of biodiversity: Ecological, economic, social, ethical, aesthetic, and informational values of biodiversity with examples.

Threats to biodiversity: Habitat loss, degradation, and fragmentation; Poaching of wildlife; Man-wildlife conflicts; Biological invasion with emphasis on Indian biodiversity; Current mass extinction crisis

Applicable from Batch Admitted in Academic Session 2024-25 onwards

Biodiversity conservation strategies: in-situ and ex-situ methods of conservation (National Parks, Wildlife Sanctuaries, and Biosphere reserves.

Case studies: Contemporary Indian wildlife and biodiversity issues, movements, and projects (e.g., Project Tiger, Project Elephant, Vulture breeding program, Project Great Indian Bustard, Crocodile conservation project, Silent Valley movement, Save Western Ghats movement, etc)

#### **UNIT–IV**

**No. of Hours: 9 + 5 for field visit Chapter/Book Reference: TB1 [Chapter5]; TB2 [Chapters7, 20, 21, 23]; TB3 [Chapters25, 26, 27, 28, 30, 31]**

#### **Environmental Pollution and Control Measures**

Environmental pollution (Air, water, soil, thermal, and noise): causes, effects, and controls; Primary and secondary air pollutants; Air and water quality standards

Nuclear hazards and human health risks

Solid waste management: Control measures for various types of urban, industrial waste, Hazardous waste, E-waste, etc.; Waste segregation and disposal

Environmental Impact Assessment and Environmental Management System

#### **Field work/ Practical's (any one)**

Field visit to any of the ecosystems found in Delhi like Delhi Ridge/ Sanjay lake/Yamuna river and its floodplains etc., or any nearby lake or pond, explaining the theoretical aspects taught in the class room

Visit to any biodiversity park/ reserve forest/ protected area/ zoo/ nursery/ natural history museum in and around Delhi, such as Okhla bird sanctuary/ Asola Bhatti Wildlife Sanctuary/ Yamuna Biodiversity Park/ Sultanpur National Park, explaining the theoretical aspects taught in the classroom

Visit to a local polluted site (urban/rural/industrial/agricultural), wastewater treatment plants, or landfill sites, etc

#### **TEXT BOOKS:**

**TB1.** Sanjay Kumar Batra , Kanchan Batra ,Harpreet Kaur; Environmental Studies; Taxmann's, Fifth Edition.

**TB2.** M.M. Sulphery; Introduction to Environment Management; PHI Learning, 2019

**TB3.** S.P. Mishra, S.N. Pandey; Essential Environmental Studies; Ane Books Pvt. Ltd. ; Sixth Edition.

#### **REFERENCE BOOKS:**

**RB1.** Asthana, D. K. (2006).Text Book of Environmental Studies. S. Chand Publishing.

**RB2.** Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India

**RB3.** Bharucha, E. (2013). Textbook of Environmental Studies for Undergraduate Courses. Universities Press.

**RB4.** Mahapatra, R., Jeevan, S.S., Das, S. (Eds) (2017). Environment Reader for Universities, Centre for Science and Environment, New Delhi.

**RB5.** Masters, G. M., & Ela, W. P. (1991).Introduction to environmental engineering and science. Englewood Cliffs, NJ: Prentice Hall.

**RB6.** Odum, E. P., Odum, H. T., & Andrews, J. (1971).Fundamentals of ecology. Philadelphia: Saunders.

**RB7.** Sharma, P. D., & Sharma, P. D. (2005).Ecology and environment. Rastogi Publication

**Course Code: BCA 102P**  
**Course Name: DBMS Lab**

**L P C**  
**0 2 2**

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 102T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

**Course Code: BCA 104P**  
**Course Name: Object Oriented Programming Using Java Lab**

**L P C**  
**0 2 2**

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 104T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

**Course Code: BCA 106P**  
**Course Name: Data Structures and Algorithms Lab**

**L P C**  
**0 2 2**

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 106T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement

**Course Code: BCA 108P**  
**Course Name: Software Engineering Lab**

**L P C**  
**0 2 2**

**INSTRUCTIONS**

- 1.The course objectives and course outcomes are identical to that of BCA 108T as this is the practical component of the corresponding theory paper.
2. The practical list shall be notified by the teacher in the first week of the class commencement