Bachelor of Computer Applications

Rules-Regulations & Curriculum

(w.e.f. 2024-25)

REGISTRAR
Sai Tirupati University
Udaipur (Raj.)

Director

PIMS Institute of Computer Sciences

(A Constituent Unit of Sai Tirupati University, Udaipur)

Ordinance Relating to BCA

Duration of Course: The duration of the BCA will be of three years.

Eligibility for Bachelor in Computer Application:

- 12^{th} Pass in any stream

1. Scheme of Examination:

a) A candidate who has attended the regular course study will be eligible for the examination of the course.

b) The examinations will be conducted by means of written papers in Theory, Practical & Projects & Seminar as laid down in the plan & scheme of examination. Candidate will be required to pass separately in Theory, Practical, Project works & Seminar (including internals). The medium of instruction and examination will be in English and Hindi.

c) No candidate will be allowed to appear in any exam unless he/she has attended 75% of the classes held in each theory, practical and project work separately in each subject in an academic year.

d) Bachelor of Computer Application (BCA) will have a semester based examination pattern.

e) There will be two examinations (one internal & one main exam) in each paper of BCA. A candidate has to appear in the scheduled main examination after the completion of regular course study and if he/she fails in one or more subject he/she shall appear in the subsequent examination of the failing subject only. This exam will be considered as Due exam.

f) No candidate will be declared as passed unless he/she has secured minimum 40% marks in each internal & main examination and aggregate marks shall be 50% overall in a year.

g) A Candidate failing in one or more subject (each theory and practical examination shall be considered as the subject) will appear in the supplementary exam.)

h) Candidate will be debarred from promotion to the next higher class. Such candidate will be examined in the failing subject only at the subsequent examination. Further such candidates will be permitted 1(one) subsequent attempts to clear the failing subject.

i) A candidate who fails in one subject (only) in main exam can proceed to the next higher class/examination the result of which will not be declared until he/she has passed the failing subjects of the previous class.

j) Division/ Class will be awarded on the basis of aggregate of the university examinations regardless of the attempts as shown below:

First Division – 60% and above

Second Division – More than 50% and less than 60%

Third Division- More than 40% and less than 50%

*Candidates securing 75% marks in a subject in the first attempt will be awarded a Distinction (D) in that subject.

2. Industrial Project:

Every candidate has to prepare a Project Report on related industrial projects which has to be submitted for the main exams of sixth semester from which the Total marks will be awarded. [Total-550 marks (Synopsis: 50 Marks | Project Report: 500 Marks)].

3. Seminar:

In the odd semester, students are required to deliver a minimum of three seminars as part of their curriculum, each carrying 50 marks towards internal evaluation. These seminars are designed to enhance subject comprehension, communication skills, and research aptitude. Active participation and thorough preparation are key to succeeding in this evaluative process.

I Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-101T	Introduction to IT	30	70	100
BCA-102T	Business Communication	30	70	100
BCA-103T	Computer Organization	30	70	100
BCA-104T	Programming in C	30	70	100
BCA-105P	Programming in C Practical	-	100	100
BCA-106P	Office Management Lab	-	100	100
BCA-107S	Seminar	50	-	50
	Total	**170**	**480**	**650**

II Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-201T	Basic Mathematics	30	70	100
BCA-202T	Database Management System	30	70	100
BCA-203T	Business Management	30	70	100
BCA-204T	Programming in C++	30	70	100
BCA-205P	SQL Practical Lab	-	100	100
BCA-206P	Programming in C++ Practical	-	100	100
BCA-207P	Web Designing Practical	50	-	50
	Total	**170**	**480**	**650**

III Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-301T	Computer Networking	30	70	100
BCA-302T	Cloud Computing	30	70	100
BCA-303T	Data Structure in C++	30	70	100
BCA-304T	Environmental Studies	30	70	100
BCA-305P	Data Structure Practical	-	100	100
BCA-306P	Digital Marketing Practical	-	100	100
BCA-307S	Seminar	50	-	50
	Total	**170**	**480**	**650**

IV Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-401T	Introduction to Python	30	70	100
BCA-402T	Java Programming	30	70	100
BCA-403T	Operating System	30	70	100
BCA-404T	Artificial Intelligence	30	70	100
BCA-405P	Java Programming Practical	-	100	100
BCA-406P	Introduction to Python Practical	-	100	100
BCA-407P	Tally ERP9	50	-	50
	Total	**170**	**480**	**650**

V Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-501T	Software Engineering	30	70	100
BCA-502T	Data Analytics & Data Science	30	70	100
BCA-503T	Network Security and Management	30	70	100
BCA-504T	Front End Development using React JS	30	70	100
BCA-505P	Multimedia Lab	-	100	100
BCA-506P	Minor project	-	100	100
BCA-507S	Seminar	50	-	50
	Total	**170**	**480**	**650**

VI Semester

Course Code	Course	Internal Exam Marks	External Exam Marks	Total Marks
BCA-601IP	Industrial Project	50	500	550
	Grand Total			**3800**

BCA - I Semester

Introduction to IT (BCA-101T)

Unit 1:

Introduction to Computers: Characteristics of computers, Evolution of computers, generation of computers, classification of computers, applications of computers. Computer Program: Introduction, developing a program, algorithm, flowchart, pseudo code. Computer Languages: Introduction, classification of programming languages, generations of programming languages, features of a good programming language. Computer Software: Software definition, relationship between software and hardware, software categories, system software, application software, utility software.

Unit 2:

Input and Output Devices: Keyboard, pointing devices, speech recognition, digital camera, scanners, optical scanners. Classification of output devices, Hard copy output devices- printers, plotters, computer output microfilm (COM), Classification of output devices, Soft copy output devices- monitors, audio output, projectors, and terminals. Computer System: Central processing unit (CPU), Memory, instruction format, instruction set.

Unit 3:

Primary and Secondary Memory: Memory hierarchy, Random access memory (RAM), types of RAM, Read only memory (ROM), types of ROM. Classification of secondary storage devices, magnetic tape, magnetic disk, optical disk. Number Systems: Introduction to number system, Binary, Octal, Hexadecimal, conversion between number bases, Alphanumeric-EBCDIC and ASCII, Sets Theory, Types of Sets, Multi Sets, Operations on Sets.

Unit 4:

Office Management Tools: MS-Word: Creating Saving documents, Entering, Editing, Page formatting, Finding and replacing text, Spell checking and Grammar checking, Indexing, Columns, Tables and feature there in, Inserting (Objects, picture, files etc.), Using Graphics, using Mail Merge, using Word Art, customizing MS Word. MS Excel: Spreadsheet terminology, organization of the worksheet area, editing cells using commands and functions, formatting worksheet, creating & editing charts, naming range and using statistical, mathematical and financial functions, multiple worksheets and Macros, working with objects, Worksheet printing options.

Unit 5:

MS Power Point: Anatomy of a Power Point Presentation, Creating and Viewing a presentation, Managing Slide Shows, using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, adding graphics, multimedia and special effects, creating presentations for the web.

Recommended Books:

1.P.K.Sinha ,Fundamentals of Computers, BPB Publications

2.Fundamental of Computers By R. Thareja, Oxford University Press.

3. Introduction to Information Technology-ITL Education solutions limited, PEARSON.

Business Communication (BCA-102T)

Unit 1:

Introduction to Business Communication: The Role and Importance of Communication in Business; The Communication Process and its Elements; Barriers to Effective Communication and Strategies to Overcome Them; Ethics and Social Responsibility in Business Communication and The Impact of Technology on Business Communication.

Unit 2:

Written Business Communication: Principles of Effective Business Writing (Clarity, Conciseness, Courtesy, Correctness); Formatting and Structure of Business Documents (Emails, Letters, Memos, Reports); Writing Business Proposals and Persuasive Messages; Resume Writing and Cover Letter Techniques and Business Etiquette in Written Communication.

Unit 3:

Oral Communication and Presentations: Effective Public Speaking Techniques (Delivery, Body Language, Vocal Variety); Preparing and Organizing Presentations for Business Audiences; Visual Aids and Presentation Tools; Handling Questions and Answers During Presentations and Group Communication and Collaboration Skills.

Unit 4:

Interpersonal Communication and Listening Skills: Effective Interpersonal Skills for Business Interactions; Nonverbal Communication and Active Listening Techniques; Dealing with Conflict and Negotiation Skills; Intercultural Communication Considerations and Building and Maintaining Professional Relationships.

Unit 5:

Business Communication Technologies: Effective Communication Through Email and Instant Messaging; Utilizing Video Conferencing Platforms for Business Meetings; Social Media in Business Communication; Collaboration Tools and Project Management Software and The Future of Business Communication Technologies.

Recommended Books:

1 Chundawat Jain Khicha, RBD Publishing House.

2 Essentials of Business Communication, Rajendra Pal, JS Korlahhi: Sultan Chand & Sons, New Delhi.

3 Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi.

4 Raymond V.Lesikav, John D. Pettit Jr.: Business Communication; Theory and Application, All India Traveller Bookseller, New Delhi 51.

Computer Organization (BCA-103T)

Unit 1:

Building blocks of computer system: Basic building blocks: I/O, Memory, ALU and its components, Control Unit and its functions, Instruction word, Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations.

Unit 2:

Addressing techniques and registers: Addressing techniques, Direct, Indirect, Immediate, Relative, Indexed addressing and paging. Registers Indexed, General purpose, Special purpose, overflow, carry, shift, scratch, Memory Buffer register; accumulators; stack pointers; floating point; status information and buffer registers.

Unit 3:

Memory: Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, Flip-flops, Combinational circuits, Sequential circuits. EAROM, Cache and Virtual memory.

Unit 4:

Interconnecting System components: Buses, interfacing buses, Bus formats – address, data and control, interfacing keyboard, display, auxiliary storage devices and printers. I/O cards in personal computers.Introduction to Microprocessors and Microcontrollers: Introduction to 8085 microprocessors, examples of few instructions to understand addressing techniques. Difference between microprocessor and microcontrollers.

Unit 5:

Logics: Representation of Integers: Octal, Hexadecimal, Decimal, and Binary, 2's complement and 1's complement arithmetic, floating point representation.

Recommended Books:

1. Andrew S. Tanenbaum , Structured Computer Organization, Prentice Hall
2. William Stallings, Computer Organization and Architecture, Sixth Edition, Pearson.
3. Digital Design and Computer Organization M. Morris Mano, Pearson Education

Programming in C

BCA-104T

Unit 1: Introduction to C programming: History of C- Character set - Structure of a C program - constants, variables and keywords. Expressions – Statements – Operators – Arithmetic, Unary, Relational and logical, Assignment, Conditional. Library functions.
Data Input and output – Single character input, get char, fetch, etc. – Single character output: char, put, Formatted I/O scan, print, gets, puts.

Unit 2: Control structures and arrays: Branching: condition: if, if. Else, switch. Looping: while, do. While, for, nested control structures, break, continue statement, go to statement. Arrays: definition, processing, types - One and Two dimensional arrays. String, string operations, arrays of strings.

Unit 3: Functions and Pointer: Functions: Definition, Accessing and prototyping, types of functions, passing arguments to functions, recursion, passing arrays to functions. Pointers: Definition, notation, applications, call by reference.

Unit 4: Structures and Unions: Structures: Definition, Processing, user defined data type typed - Unions – definition, declaration and accessing union elements. Enumerated Data type.
Unit 5: File Handling: Files: File opening in different modes, closing, reading and writing. open, close, print, scan, get, put.

Recommended Books:

1. The C Programming Language, Brian Kernighan and Dennis Ritchie, PHI Publications.
2. Let us C, Yashavant Kanetkar, BPB Publications.
3. Programming in C, Balaguruswamy, McGraw Hill Education.

Programming in C

Practical (BCA-105P)

Practical based on paper Programming in C in BCA-104. This paper helps in getting practical exposure towards the C language, which is a programming language to develop the overall view point towards this language.

Office Management Lab
(BCA-106P)

MS Word Tasks:

1. Create and save a new document, then enter and edit a paragraph.
2. Format a page with specific margins, orientation, and size.
3. Find and replace text in a document.
4. Use spell check and grammar check features.
5. Create an index for a document.
6. Set up columns and insert a table with data.
7. Insert objects like images and files into a document.
8. Use graphics and WordArt to enhance document presentation.
9. Perform a mail merge using a sample data source.
10. Customize the toolbar and ribbon for frequently used commands.

MS Excel Tasks:

1. Format a worksheet, including font, borders, and cell shading.
2. Create and edit various types of charts (e.g., bar, pie, line).
3. Name a range of cells and use it in a formula.
4. Apply statistical functions (e.g., AVERAGE, COUNT) to a data set.
5. Use mathematical functions like SUM and PRODUCT.
6. Implement financial functions such as PMT or FV.
7. Work with multiple worksheets and link data between them.
8. Record and run a simple macro for repetitive tasks.

MS PowerPoint Tasks:

1. Create a new presentation and add multiple slides.
2. Use different views (Normal, Slide Sorter) to organize slides.
3. Set up and manage a slide show, including transitions.
4. Use hyperlinks to connect slides or external resources.
5. Utilize action settings and buttons for advanced navigation.
6. Organize and format slides using Master Slides.
7. Add graphics and multimedia elements like videos and audio.
8. Apply special effects, such as animations and transitions.
9. Create a presentation optimized for web delivery.
10. Design a professional presentation using themes and templates.

Seminar

BCA-107S

Describe a presentation on any topic covered in the whole semester. It must be individual and a minimum 10 slides need to be presented.

BCA - II Semester

Basic Mathematics

BCA-201T

Unit 1: Set Introduction: Objectives, Representation of Sets (Roster Method, Set Builder Method), Types of Sets (Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set) and Operation with Sets (Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set) Universal Sets, Complement of a Set.

Unit 2: Functions, Limit and Continuity: Functions, Kinds of Functions , Concept of real function, Domain and Range (simple cases), Composition Function, One-to-one, onto, into, invertible functions, Mathematical Functions , Exponential and Logarithmic Functions, Graph of functions (plotting of linear function, absolute value function, parabolic functions, Sin(x), Cos(x), tan(x), reciprocal function, ex , log in, Signup function), Polar coordinates and graph, Limit of variable, Limit of function, Evaluation of limits of various types of functions, Continuity & Discontinuity at a point, Continuity over an interval.

Unit 3: Logic Statement: Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.

Unit 4: Matrices Introduction: Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Null Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication, Negative of Matrix, Addition of Matrix, Difference of two Matrix, Multiplication of Matrices, Transpose of a Matrix.

Unit 5: Binary Arithmetic: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication).

Recommended Books:

1. Discrete Mathematics, Schaum's Outlines
2. NCERT Applied Mathematics CLASS XI, XII

Database Management System

BCA-202T

Unit 1: Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and database language and their interfaces, Data definition language, DML, Overall Database Structure.

Unit 2: Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagram to tables, extended ER model.

Unit 3: Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.

Unit 4: SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Insert, update and delete operations, sub queries, Aggregate functions, Joins, Unions, Intersection, Minus operations. Roles and Privileges.

Unit 5: File and system structure: overall system structure, file organization, logical and physical file organization, sequential and random, hierarchical, inverted, nullity, indexing and hashing, B-tree index
files.

Recommended Books:

1. Date C J, “An Introduction To Database System”, Addision Wesley
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
3. Elmasri, Navathe, “Fundamentals of Database Systems”, Addision Wesley
4. Paul Beynon Davies, “Database Systems”, Palgrave Macmillan

Business Management

BCA-203T

Unit 1: Business and Management: Business Meaning and Contents, Business as a system, Business Environment. Management Concept and Nature, Management Process, Basic function of Management, Management Level, Role of Manager, Management Principles (Henry Fayol's principle of management, Taylor's Scientific Management).

Unit 2: Organizational Behavior: Need of Understanding human behavior in organization, Challenges and Opportunities for OB.

Unit 3: Management by Objective (MBO): Decision making process and models, Conflict Management, Strategies & Policies.

Unit 4: Managing Personnel: HRM- Meaning and Functions, Man Power Planning, Job Analysis and Design, Training, Career Planning & Development. Motivation Theories & Practices, Leadership Concept theories & Style, Compensation Management.

Unit 5: Marketing Management and Finance: Basic Concepts of Marketing, Nature & Scope of Marketing, Sales Promotion, Product Life Cycle, Marketing Information System (MIS) and Marketing Research. Main Sources of Finance, Concept of Fixed & Working Capital, Introduction of Tax – Income Tax, Service Tax & VAT, Basic Concept of Invoice & Quotations.

Recommended Books:

1. Dr. C.B. Gupta, Business Management, Sultan Chand and Sons.

2. B.P. Singh & T.N. Chabbra, "Business Organization and Management Functions" , Dhanpat Rai & Co. 2000.

3. P.C Tripathi & P. N. Reddy, "Principles of Management", Tata McGraw Hill Publishing Company New Delhi.

4. L.M. Prasad, "Principles and Practices of Management".

5. Stephen P. Robbins, "Organizational Behaviour", (8th Ed.) Prentice Hall of India.

Programming in C++

BCA-204T

Unit 1: Evolution of OOP: OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading.

Introduction to C++: Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, input and output, conditional expression loop statements, breaking control statements.

Unit 2: Defining function: Types of functions, storage class specifiers, recursion, pre-processor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations.

Classes: Member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, dynamic memory allocation.

Unit 3: Inheritance: Single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control.

Unit 4: Polymorphism: Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions.

Unit 5: Operation on Files: Opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing.

Recommended Books:

1. Data Structures in C/C++, Tanenbaum, PHI
2. Data Structures in C/C++, Horowitz, Sawhney.
3. Practical C++ Programming, Steve Oualline, O'Reilly.
4. How to Program C++, Dietel, Pearson

SQL Practical Lab

BCA-205P

Exercises based on creating table, inserting data into tables, viewing data in the tables, sorting data in table, deleting tuples from table, updating the contents of a table, modifying the structure of table, applying primary key, foreign key and unique key constraints, computations on table data, oracle functions, grouping data from tables, sub queries, Joins.

Programming in C++ Practical

BCA-206P

Practical based on paper BCA-204 Programming in C++

Web Designing Practical

BCA-207P

Introduction of HTML: Introduction, markup language, editing HTML: Common tags, headers, text styles, linking, images, formatting text, horizontal rules and more line breaks, unordered lists, nested and ordered lists, basic HTML tables intermediate HTML tables and formatting: Basic HTML forms, more complex HTML forms, internal linking, creating and using image maps.

Cascading Style Sheets: Introduction and Work. Webpage development using WordPress.

Recommended Books:

1. Internet & World Wide Web How to Program, Dietel & Dietel, Pearson.
2. Web Programming, Bai wt.al, Thomson

BCA - III Semester
Computer Networking

BCA-301T

Unit 1: Principles of Data Communication: Evolution of computer networks, General features and tasks of a communication system, Fundamentals of signals, carrier waves, modes of transfer: simplex, half duplex, full duplex, types of networks: LAN, WAN, MAN, SAN, PAN, CAN, VPN, EPN. Introduction to serial communication.

Unit 2: Networking Architecture: ISO-OSI, IBM SNA architecture –their functions of each layer and implementation. Concepts of circuit switching, packet switching and message switching. Fundamentals of datagrams. Flow and Error Control – Stop and Wait, Sliding Window, Automatic Repeat Request.

Unit 3: Data communication concepts: Connecting devices, hub, switch, bridge, routers and gateways, Signal encoding and decoding techniques - Amplitude Modulation, Frequency Modulation, Phase Modulation, signal bandwidth requirements, signal formats used in LAN, Network Protocols: LAN cabling standards: IEEE LAN standards.

Unit 4: Error detection and correction codes: Parity bit, Checksum, Hamming codes, CRC, single error detection and correction. Introduction to Network Security Model, concepts of key, Caesar cipher, transposition cipher, DES.

Unit 5: Transmission media: twisted pair, coaxial cable, optical-fiber. LAN topologies: STAR, BUS and RING network, LAN access techniques: ALOHA, CSMA, token ring and token bus. Issues related with network reliability and fault redundant network systems.

Recommended Books:

1. Stalling, Data & Computer Communication, 8th
2. Tanenbaum; Computer Network, 4th Ed., Pearson.Ed., Pearson.
3. Kurose; Computer Networking, 3rd Ed., Pearson

Cloud Computing

BCA-302T

Unit 1: Introduction: Objective, scope and outcome of the course. Introduction Cloud Computing: Nutshell of cloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges, Risks and Approaches of Migration into Cloud. Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and Economics.

Unit 2: Future of the cloud: Networking Support for Cloud Computing. Ubiquitous Cloud and the Internet of Things.

Unit 3: Securing the Cloud: Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture. Legal issues in cloud computing.

Unit 4: Data Security in Cloud: Business Continuity and Disaster Recovery, Risk Mitigation, Understanding and Identification of Threats in Cloud, SLA-Service Level Agreements, Trust Management.

Unit 5: Cloud Platforms in Industry: Amazon web services, Google App Engine, Microsoft Azure Design, Aneka: Cloud Application Platform -Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite Image Processing, CRM.

Recommended Books:

1. Distributed and Cloud Computing, Kai Hawang, Geofrey C.Fox, Jack J. Dongarra Elservier

2. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

3. Cloud Computing, Kumar Saurabh, Wiley Pub

4. Cloud Security, Krutz, Vines, Wiley Pub

Data Structure in C++

BCA-303T

Unit 1: Linear Structure: Arrays, records, stack, operation on stack, implementation of stack as an array, queue, operations on queue, implementation of queue.

Unit 2: Linked Structure: List representation, operations on linked list - get node and free node operation, implementing the list operation, inserting into an ordered linked list, deleting, circular linked list, doubly linked list.

Unit 3: Tree Structure: Binary search tree, inserting, deleting and searching into binary search tree, implementing the insert, search and delete algorithms, tree traversals.

Unit 4: Graph Structure: Graph representation - Adjacency matrix, adjacency list, adjacency multi-list representation. Orthogonal representation of graph. Graph traversals - BFS and DFS. Shortest path, all pairs of shortest paths, transitive closure, reflexive transitive closure.

Unit 5: Searching and sorting: Searching - sequential searching, binary searching, hashing. Sorting - selection sort, bubble sort, quick sort, heap sort, merge sort, and insertion sort, efficiency considerations.

Recommended Books:

1. An introduction to data structures with applications By Jean-Paul Tremblay, P. G. Sorenson,TMH

2. Object Oriented Design & Modelling, Rambaugh, PHI.

Environmental Studies

BCA-304T

Unit 1: The multidisciplinary Nature of Environment Studies: Definition, Scope & Importance, need for public awareness, Natural Resources & Its conservation – Energy resources – Growing energy needs renewable & Nonrenewable energy Resources, Use of alternative energy resources – solar and wind energy, Forest Resources – Use & over-exploitation, deforestation & their effects on forest & tribal people, Land resources – Land as resource, land degradation, soil Erosion & Desertification.

Unit 2: Natural resources and its conservation- Water resources: Use and over utilization of surface and ground water, Floods, Drought, Conflicts over water, Mineral resources: Use and exploitation, Effect of extracting and using mineral resources on environment, Food resources: World food problem, Strategies of modern agriculture to increase food production, Effect of fertilizers and chemical pesticides on food.

Unit 3: Concept of an ecosystem: Structure of an ecosystem, Energy flow in the ecosystem, Food chains, food web and ecological pyramid, Brief idea about terrestrial ecosystem and aquatic ecosystem.

Unit 4: Biodiversity & Its conservation: Introduction – Definition: genetic, species & ecosystem, Diversity - Value of Biodiversity, Biodiversity at global, national & local levels, Threats to Biodiversity - habitat loss, poaching of wildlife, Important Endangered species of India.

Unit 5: Environmental pollution: Causes, effect and control measures: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, Socio-Legal Issues related to Environment Protection, Role of NGO's and individual in prevention of pollution, Environmental protection Act.

Recommended Books:

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

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

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

Data Structure Practical

BCA-305P

1. Write a C program for implementation of 2 D Array.
2. Write a C program for implementation of stack using Array.
3. Write a C program for implementation of a queue using Array.
4. Write a C program for implementation of circular queue using Array.
5. Design, develop and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The operators are +(add), -(subtract), *(multiply), /(divide).
6. Design, develop and execute a program in C to read a sparse matrix of integer values and make a transpose of it. Use the triple to represent an element in a sparse matrix.
7. Design, develop and execute a program in C to implement a singly linked list where each node consists of integers. The program should support the following functions.

a) Create a singly linked list.
b) Insert a new node.
c) Delete a node if it is found, otherwise display appropriate messages.
d) Display the nodes of a singly linked list.

8. Design, develop and execute a program in C to implement a doubly linked list where each node consists of integers. The program should support the following functions.

a) Create a doubly linked list.
b) Insert a new node.
c) Delete a node if it is found, otherwise display appropriate messages.
d) Display the nodes of doubly linked lists.

9. Using array representation for a polynomial, design, develop and execute a program in C to add two polynomials and then print the resulting polynomial.
10. Write a program in C to construct binary tree and binary tree traversal.
11. Design, develop and execute a program in C to perform sorting and searching.

Digital Marketing Practical
BCA-306P

Unit 1: Email Marketing: Types, Promotional Informational, Newsletter, Announcement and Reengagement, Benefits, Affiliate Marketing Basics: Terminologies- merchant, affiliate marketer, consumer, affiliate network. How to become an affiliate merchant? Influencer marketing, Blogging, Referral link, Social media sites, Email lists, Create and use video platforms.

Unit 2: Search Engine Optimization: On and Off page SEO, how search engines work.

Off Page SEO: Why does off page SEO matters, Links and Off page SEO: Backlinks: Natural, Manual built and self-created, working off page SEO Social bookmarking, Crawl, classified, directory listing, website submission, ping, profile, business listing, PDF submission, Quora and article submission, web 2.0, blog submission.

Unit 3: Web Analytics: Introduction, Google Analytics, Content Performance Analysis, Visitors Analysis, Social Media Analytics, Actionable Insights and the Big Picture, Social CRM & Analysis, Digital Analytics Platform Principles.

Unit 4: Social Media Marketing: Introduction to Marketing, meta Pages and Post Best Practices, Facebook Ads – Campaign Objectives, meta Ads – Targeting Audiences, Meta Ads– Impactful Creatives, Facebook and Instagram Ads – Optimization and Reporting, Facebook Ad Policies, Facebook Messenger, Building Brand Awareness, Driving Online, Sales, Generating Leads.

Recommended Books:

1. Fundamentals of Digital Marketing by Puneet singh Bhatia, PEARSON

2. Digital Marketing: From Fundamentals to Future Paperback by Swaminathan T. N./Karthik Kumar, Cengage publications

Seminar

BCA-307S

Describe a presentation on any topic covered in the whole semester. It must be individual and a minimum 10 slides need to be presented.

BCA - IV Semester

Introduction to Python

BCA-401T

Unit 1: Python Introduction and Setting up the Environment: Introduction to Programming, Choosing Python, setting up Python environment, Python IDEs, Python Basic Syntax and Data Types, Input/output, Comments, Variables, Data types, Typecasting.

Unit 2: Operators: Arithmetic, Assignment, Comparison, Logical, Identity, Membership, Bitwise operators. Strings in Python: Creating, Formatting, Indexing, Slicing, String methods.

Unit 3: Lists: Creating, Properties, Indexing, Slicing, Methods, Modifying lists. Tuples: Syntax, Properties, Indexing, Slicing, Methods. Dictionaries: Syntax, Keys/values, Accessing, Methods.

Unit 4: Conditional Statements: if, if-else, if-else-else, Loops in Python: while, for, break, continue, List and Dictionary Comprehensions Syntax, uses. Functions in Python: Creating, Calling, Arguments, Variables, Recursion.

Unit 5: Database Access: MySQL, CRUD operations.

Recommended Books:

1. Dive into Python, Mark Pilgrim, Apress,
2. How to Think Like a Computer Scientist Learning with Python Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press,
3. Introduction to Computation and Programming using Python, John V. Guttag, Prentice Hall of India.

Java Programming

BCA-402T

Unit 1: Introduction to Java: Bytecode, features of Java, data types, variables and arrays, operators, control statements. Objects & Classes: Object Oriented Programming, defining classes, static fields and methods, object construction.

Unit 2: Inheritance: Basics, using super, method overriding, using abstract classes, using final with inheritance. Packages and Interfaces: Defining a package, importing package, defining an interface, implementing and applying interfaces.

Unit 3: Exception Handling: Fundamentals, exception types, using try and cache.

Unit 4: Multithreaded Programming: Creating a single and multiple threads, thread priorities, synchronization.

Unit 5: Applets: Applets basics, applets architecture, applets skeleton, the html applet tag, passing parameters in applets. Event Handling: Event classes and event listener interfaces.

Recommended Books:

1. The complete reference Java 2, H. Schildt, Tata Mc-Graw Hill.
2. Programming with JAVA - A Primer,E. Balaguruswamy,McGraw-Hill
3. Head First Java: A Brain-Friendly Guide,Kathy Sierra, Bert Bates,"O'Reilly Media.
4. Thinking in Java,Bruce Eckel,Prentice Hall Professional.

Operating System

BCA-403T

Unit 1: Introduction: Definition of Operating System, Types of operating systems: Batch Systems, Multi programming, Multiuser, Multitasking, Time–sharing, Spooling, Parallel, Distributed and Real-time systems, Operating System Concepts, Operating System Services, System calls.

Unit 2: Process Management: Process concept, Process States, Representation of process (PCB), Process Scheduling, CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Algorithm evaluation.

Unit 3: Memory Management: Contiguous, Non-contiguous, Swapping, Fragmentation, Compaction, Paging, Segmentation, Virtual memory management, Demand paging, Page replacement and Virtual memory concepts, Introduction to Thrashing.

Unit 4: The Deadlock problem: Characterization (Hold and wait, Circular Wait, No Pre-emption, no sharing of resources), Prevention, Avoidance: (RAG and Wait for Graph), Detection and Recovery from Deadlock: (Banking algorithm and detection algorithm), Concept of Fork and Join methods.

Unit 5: Process concurrency: Concept of concurrency, cooperating process, precedence graph, Critical section problem, Mutual exclusion, semaphores, classical process (Reader Writer problem, Consumer producer problem, Dining Philosopher problem), Inter Process Communication.

Recommended Books:

1. Silberschatz G.G., Operating System Concepts, John Wiley & SonsInc.
2. Modern Operating Systems, Andrew S. Tanenbaum, Pearson Prentice Hall,
3. Advanced Concepts in Operating Systems Distributed, Database, and Multiprocessor Operating Systems, Mukesh Singhal and Niranjan G. Shivaratri, Tata McGraw-Hill

Artificial Intelligence

BCA-404T

Unit 1: General Issues and overview of AI: Concept of AI, AI technique, Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving, Production systems, and Control strategies, forward and backward chaining Exhaustive searches: Depth first and Breadth first search.

Unit 2: Heuristic Search Techniques: Hill climbing, Branch and Bound technique, Best first search and A* algorithm, AND/OR, Graphs, Problem reduction and AO* algorithm, Constraint Satisfaction problems, Game Playing Min Max Search procedure.

Unit 3: Knowledge Representation: First Order Predicate Calculus, Resolution Principle and Unification, Inference Mechanisms, Horn's Clauses, Semantic Networks, Frame Systems, Scripts, Conceptual Dependency AI Programming Languages.

Unit 4: Natural Language Processing: Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Tokenization, Part-of Speech Tagging, Issues in Part-of-Speech tagging. Semantics and Pragmatics-Requirements for representation, Syntax-Driven Semantic analysis, Introduction to syntactic analysis.

Unit 5: Expert Systems: Introduction to Expert Systems, Architecture of Expert Systems, Expert System Shells, Knowledge Acquisition, Case Studies of Expert System. Learning: Concept of learning, Types of learning.

Recommended Books:

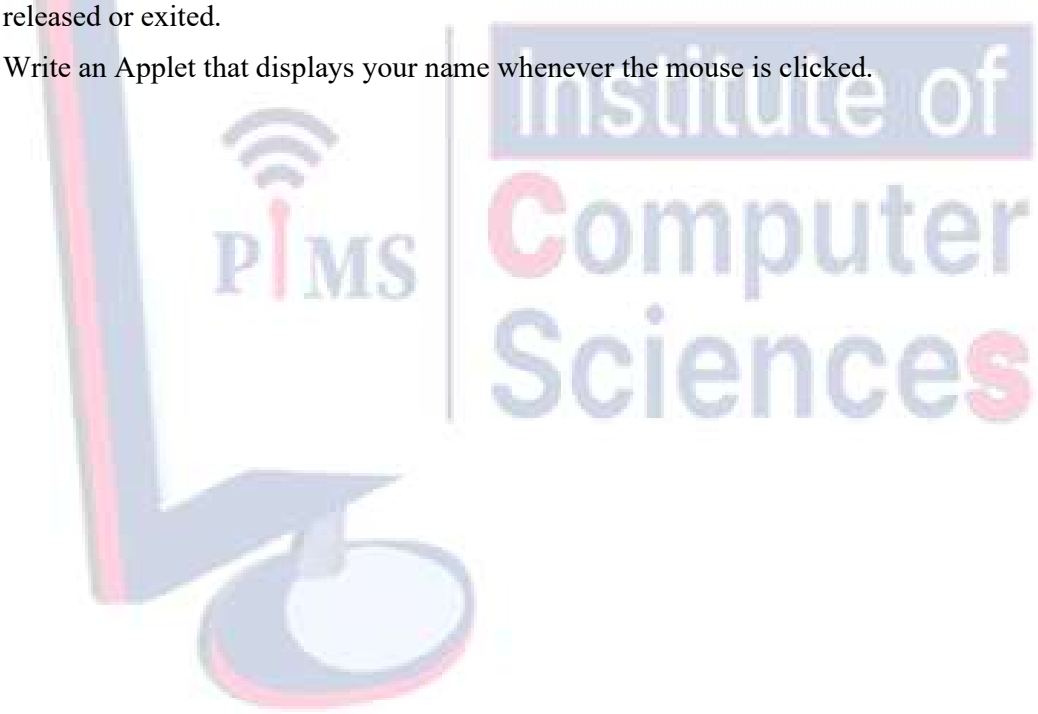
1. Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
2. Introduction to AI & Expert System: Dan W. Patterson, PHI.
3. Artificial Intelligence by Luger (Pearson Education)
4. Russel & Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall

Java Programming Practical

BCA-405P

1. Write a program that creates and initializes a four-element into an array. Calculate and display the average of its values.
2. Write a program to swap two values using object reference. Your program should have a swap function**.**
3. Write an application that accepts two doubles as its command line arguments, multiple these together and display the product.
4. Write an application that accepts one command line argument; display the line of reporting if the number is even or odd.
5. Write an application that accepts the radius of a circle as its command line argument displays the area.
6. WAP that describes a class person. It should have instance variables to record name, age and salary.
7. Create a personal object. Set and display its instance variables.
8. Write a program that uses length property for displaying any number of command line arguments.
9. WAP to display the use of this keyword.
10. Write a program that can count the number of instances created for the class.
11. WAP that implements method overloading.
12. WAP that shows passing objects as parameters.
13. WAP that illustrates method overriding.
14. Write a program to show that the value of a non-static variable is not visible to all the instances, and therefore cannot be used to count the number of instances.
15. WAP to illustrate simple inheritance.
16. WAP illustrates a super class variable referencing a sub class object.
17. WAP illustrating all uses of super keywords.
18. Create an abstract class shape. Let rectangle and triangle inherit this shape class. Add necessary functions.
19. Write an application that creates a package p1. Add some classes in it.
20. Write an application that uses the package p1 created in the program 21.
21. Write an application to illustrate Interface Inheritance.

22. Write an application that shows the usage of try, catch, throws and finally.
23. Write an application that shows how to create a user-defined exception.
24. Write an application that shows thread synchronization.
25. Write an application that displays deadlock between threads.
26. Write an application that shows thread priorities.
27. Write a program that displays the life cycle of an Applet.
28. Write an Applet displaying line, rectangle, rounded rectangle, filled rectangle, filled rounded rectangle, circle, ellipse, arc, filled arc and polygon, all in different colors.
29. Write an Applet that displays a counter in the middle of the applet.
30. Write an Applet that illustrates how to process mouse click, enter, exit, press and release events. The background color changes when the mouse is entered, clicked, pressed, released or exited.
31. Write an Applet that displays your name whenever the mouse is clicked.



Introduction to Python Practical
BCA-406P

Unit 1: Python Introduction and Setting up the Environment

1. Install Python and Set Up an IDE:
   a. Download and install Python from the official website.
   b. Choose and set up an IDE (like PyCharm, VSCode, or Jupyter Notebook) for Python development.
2. Write a Simple Python Program:
   a. Create a Python script that prints "Hello, World!" to the console.
   b. Add comments explaining each line of code.
3. Practice Basic Syntax and Data Types:
   a. Write a Python program that defines variables of different data types (integer, float, string, Boolean) and prints their values and types.
4. Implement Typecasting:
   a. Write a Python script that reads user input as a string and converts it into different data types (into, float) for further use.

Unit 2: Operators and Strings in Python

5. Use Different Operators:

a. Create a Python program that demonstrates the use of arithmetic, comparison, logical, and bitwise operators with example expressions.

6. String Manipulation:

a. Write a Python script that creates a string, formats it using f-strings or format method, and performs operations like indexing, slicing, and using string methods (e.g., upper (), find (), replace ()).

Unit 3: Lists, Tuples, and Dictionaries

7. Work with Lists:

a. Create a Python program that initializes a list with several elements, performs operations such as indexing, slicing, and applying methods like append (), remove (), and sort ().

8. Create and Use Tuples:

a. Write a script that defines a tuple with some elements and demonstrates accessing elements, slicing, and using methods (e.g., count (), index ()).

9. Manipulate Dictionaries:

a. Write a Python program that creates a dictionary with key-value pairs, demonstrates accessing values, adding new entries, and updating existing entries.

Unit 4: Conditional Statements, Loops, and Functions

10. Implement Conditional Statements:

a. Create a script that takes user input and uses if, if-else, and if-elif-else statements to provide different responses based on the input.

11. Use Loops:

a. Write a Python program that uses both while and for loops to iterate over a range of numbers and a list, and demonstrates the use of break and continue statements.

12. Practice List and Dictionary Comprehensions:

a. Write a Python script that generates a list of squares of numbers using list comprehension and a dictionary with squares as keys and their roots as values using dictionary comprehension.

13. Define and Call Functions:

a. Create a Python function that takes parameters, performs some calculations, and returns a result. Write code to call this function with different arguments and print the results.

14. Implement Recursion:

a. Write a recursive function to solve a problem like calculating factorial or generating Fibonacci numbers and test it with different values.

Unit 5: Database Access:

15. Perform CRUD Operations with MySQL:

a. Set up a MySQL database and write Python scripts using the MySQL-connector-python package to connect to the database and perform CRUD (Create, Read, Update, Delete) operations on a sample table.

Tally ERP9
BCA-407P

Unit 1: Introduction of Basic and advanced accounting, ledger, posting, trail balance, Introduction to Tally ERP9 Introduction, features, getting started with tally, company creation, Display/Alter. F11 features, F12 configuration, single and multiple ledger creation, Display/Alter ledger, Accounting group of ledgers-how to create, manage and operate groups, Display/Alter groups.

Unit 2: Inventory control system: stock groups, display/alter stock groups, delete stock group, unit of measures, display/alter unit of measures, compound unit, stock item, stock category creation, display /alter stock category, delete a stock category, Godown creation.

Unit 3: Accounting vouchers: Voucher date changing, contra voucher, payment voucher, receipt voucher, journal voucher, sales voucher, purchase voucher, post-dated voucher.

Unit 4: Inventory vouchers: stock journal voucher, physical stock voucher- use separate discount column, zero valued entries in vouchers, Additional cost, use different actual billed quantity, debit note, credit note, purchase order, sales order, batch wise details, bill wise details, cost center creation, tracking number, rejection notes.

Unit 5: Reports: Day book, Trial balance, Trading and Profit and Loss account, Balance sheet, Cash/bank books, Sales register, Stock summary, Key board shortcuts.

Recommended Books:

1. Dr. Abhishek Shrivastava Financial Accounting with Tally Erp. 9

BCA - V Semester
Software Engineering
BCA-501T

Unit 1: Introduction: Software Engineering, Software Process, Characteristics of Software Process, Development Process Models- waterfall, prototyping, iterative, spiral. Project Management Process, Inspection Process, Software Configuration Management process, Requirement Change Management process.

Unit 2: Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram, entity relationship diagram and data dictionary, structured analysis, Characteristics and component of (SRS).

Unit 3: Planning a Software Project: Cost estimation, Single variable model, COCOMO model, software size estimation, Project scheduling and milestones, Verification & Validation. Software Architecture, Role views, Function oriented design – Top down and Bottom up strategies. Coupling, Cohesion. Concept of Object Oriented Analysis and Design.

Unit 4: Coding: Standard guideline for coding, Structured Programming, Object oriented programming, Information Hiding, Programming style, Internal Documentation. Testing-Level of testing, Unit testing, Black box & White box testing, Functional Testing, Structural Testing. Testing Process – level of testing, test plan, test case, defect logging and tracking.

Unit 5: Software Maintenance: Maintenance as part of software evaluation, reasons for Maintenance, types of Maintenance (Perceptive, adoptive, corrective), designing for Maintainability, techniques for Maintenance, case tools, Configuration Management.

Recommended Books:

1. Software Engineering, Pressman, TMH
2. Software engineering, Ian Sommerville, 8th Ed., Addison Wesley Longman.
3. Software Engineering Fundamentals, Ali Behforooz, Hudson, Oxford

Data Analytics & Data Science

BCA-502T

Unit 1: MS Power BI: Introduction to Power BI, connecting to Data Sources with Power BI Desktop, Querying and Shaping the Data, Data Visualizations and Data Extraction, Creating Reports and Output Options.

Unit 2: PYTHON: Data Analysis for Python, Introduction to Machine Learning, Data Visualization with Python.

Unit 3: KNIME: About Knime Analytics Platform, Visual Knime Workflows, Data Access, Big Data Transformation, Analysis & Data Mining, Visualization and Deployment.

Unit 4: Basics of Digital Forensic and Cyber Security: Introduction to Cybercrime, Recent Trends in Cybercrime, Cyber Frauds in Financial Sectors, Modus Operandi in Cyber Crimes, Importance of Digital Forensics & Ethical Hacking, Digital Forensic Process, Information Technology Crimes and Its Legal Consequences.

Unit 5: Introduction to Data Science.

Recommended Books:

1. ArshdeepBahga, Vijay Madisetti, "Big Data Analytics: A Hands-On Approach", VPT, 2018

2. NandhiniAbirami R, SeifedineKadry, Amir H. Gandomi, BalamuruganBalusamy, "Big Data: Concepts, Technology, and Architecture", Wiley, 1st edition 2021

Network Security and Management
BCA-503T

Unit 1: Security and Cryptographic algorithm: Need for security, principle of security, types of attacks. Cryptographic techniques: cryptography terminology, substitution techniques, transposition techniques, Symmetric and asymmetric key algorithm, possible types of attack, key range, steganography. Symmetric vs asymmetric, algorithm types and modes, DES, double and triple DES, AES, comparison of various cryptographic algorithms and requirement of good cryptographic algorithm.

Unit 2: Asymmetric cryptographic algorithm and Message Authentication: Public key cryptography principles and algorithms, RSA algorithm, Differ-Hellman key exchange. One-way hash functions, message digest, MD5, SHA1, message authentication code, Digital envelope and Digital signatures.

Unit 3: Network Management: Management Standards and Models, configuration management, configuration database and reports, fault management, identification and isolation, protecting sensitive information, host and user authentication, structure of management information, Standard management information base, SNPv1 protocol, accounting management, performance management, network usage, matrices and quotas.

Unit 4: Network security: Overview of IPV4: OSI model, maximum transfer unit, IP, TCP, UDP, ICMP, ARP, RARP and DNS, ping, traceroute. Network attacks: Buffer overflow, IP scheduling, TCP session hijacking, sequence guessing. Network scanning: ICMP, TCP sweeps, basic port scans.

Denial of service attacks**:** SYN flood, teardrop attacks, land, surf attacks. Visual and private network topology: tunneling, IPSEC. Traffic protocols: authentication headers, ESP internet key exchange, security association PPTP, L2TP.

Unit 5: Firewalls: Firewall characteristics & design principles, types of firewalls, packet filtering router, application level gateway or proxy, content filters, bastion host. Firewall architectures: dual homed host, screening router, screened host, screened subnet. Firewall logs.

Recommended Books:

1. Network Security, Private Communication in a public world, Kaufman, c., Perlman, R., and Speciner, M., Prentice Hall.
2 Cryptography and Network Security: Principles and Practice, . Stallings, W. Prentice Hall PTR.
3. Fundamentals of Computer Security, Pieprzyk Josef, Springer-Verlag,

Front End Development using React JS
BCA-504T

Unit 1: Introduction to React: Overview of Front End Development, Introduction to React and its ecosystem, setting up the development environment, Understanding JSX and Virtual DOM, Component-based architecture, Functional vs. class components.

Unit 2: React Components and State Management

Creating and managing components, Props and Prop Types, State and lifecycle methods, Handling events in React, lifting state up, Introduction to hooks (use State, use Effect).

Unit 3: Advanced React Concepts: React Router for navigation, Context API for state management, Higher-order components and Render props, Error boundaries, Performance optimization in React.

Unit 4: Styling and Testing in React: Styling components (CSS, CSS Modules, Styled Components), Responsive design and media queries

Introduction to testing (Jest, React Testing Library), Writing unit and integration tests, Debugging React applications.

Unit 5: Building and Deploying React Applications

Working with forms and controlled components, State management with Redux or other libraries (MobX, Zustand), Building a complete React application, Introduction to Next.js for server-side rendering, Deployment strategies (Netlify, Vercel, GitHub Pages).

Recommended Books:

1. Mayur Patil React.js For Beginners

Multimedia Lab

BCA-505P

Practical related to graphics and UI/UX development.

Recommended Books:

1. Anthony E Sanchez Newbies Guide to UI/UX Design Using Figma
2. Adobe Photoshop CC Classroom in a Book by Andrew Faulkner

Minor project

BCA-506P

Based on any technology used in the whole BCA program, it can be in a group of max 2 candidates.

Seminar

BCA-507S

Describe a presentation on any topic covered in the whole semester. It must be individual and a minimum 10 slides need to be presented.

Industrial Project

BCA-601IP

Overview:

As part of the BCA VI Semester requirements, students are required to complete an industrial project in a software industry or on a software project. The project will involve a minimum of 4 months of internship, during which students will gain practical experience and contribute to real-world software development. The project will culminate in a final presentation, which will be evaluated by an external examiner. Additionally, an internal synopsis must be submitted 15 days after the start of the internship.

Instructions for Completing the Industrial Project:

1) **Project Selection and Approval**

- **Select a Project:** Choose a project relevant to software development or a software industry setting. This could involve developing a new application, enhancing an existing system, or solving a specific problem in a real-world context.
- **Approval:** Obtain approval for the project from your faculty supervisor or the academic coordinator before commencing the internship.

2) **Internship Requirements**

- **Duration:** The internship must be a minimum of 4 months in duration.
- **Organization:** Complete the internship in a recognized software company or organization that provides relevant exposure to software development practices.
- **Roles and Responsibilities:** Engage in tasks related to your project, such as coding, testing, project management, or documentation. Ensure that your work aligns with the project goals and provides meaningful contributions.

3) **Internal Synopsis Submission:**

- **Deadline:** Submit the internal synopsis 15 days after the start of your internship.
- **Content:** The internal synopsis should include:

a. **Project Title:** Clearly state the title of your project.
b. **Objectives:** Outline the objectives and goals of your project.
c. **Methodology:** Describe the approach and methods you will use to achieve the project goals.
d. **Expected Outcomes:** Provide a summary of the anticipated results or deliverables.
e. **Timeline:** Include a timeline or Gantt chart detailing the key milestones and phases of the project.
f. **Format:** Follow the prescribed format provided by your institution for the internal synopsis.

4) **Documentation and Reporting:**

- **Daily Log:** Maintain a daily log of your activities, tasks completed, and challenges faced during the internship.
- **Progress Reports:** Prepare and submit periodic progress reports to your faculty supervisor as required by your institution.
- **Final Report:** At the end of the internship, prepare a comprehensive final report that includes:

a. **Project Overview:** Description of the project, objectives, and scope.

b. **Technical Details:** Detailed account of the technologies used, methodologies followed, and any technical challenges encountered.
c. **Contributions:** Highlight your specific contributions to the project.
d. **Learning Experience:** Reflect on your learning experience and the skills acquired during the internship.
e. **Future Work:** Suggest any future enhancements or recommendations for the project.

5) Final Presentation:

- **Preparation:** Prepare a presentation summarizing your entire project, including the problem statement, objectives, methodology, outcomes, and key findings.
- **Presentation:** Deliver the presentation to an external examiner and an internal panel. Ensure that your presentation is clear, concise, and professionally prepared.
- **Q&A Session:** Be prepared to answer questions from the external examiner and the panel regarding your project and your role in it.

6) Evaluation Criteria:

- **Technical Competence:** Demonstrate your technical skills and understanding of the project.
- **Problem Solving:** Showcase your ability to address and solve real-world problems.
- **Documentation:** Ensure thorough and accurate documentation of your work.
- **Presentation Skills:** Display effective communication and presentation skills.

7) Submission Requirements:

- **Final Report:** Submit a bound copy of the final report along with any supplementary materials (code, documentation, etc.) as required.
- **Presentation Slides:** Provide a copy of the presentation slides to your faculty supervisor.

8) Additional Guidelines:

- **Ethics:** Adhere to ethical standards and confidentiality agreements related to your project and the organization.
- **Feedback:** Seek feedback from your supervisor or mentor throughout the internship to ensure continuous improvement.

By following these instructions, you will successfully complete your industrial project and fulfill the requirements for the BCA VI Semester. Ensure timely submission of all documents and preparation for the final presentation to achieve the best outcomes in your assessment.

PERFORMA FOR CERTIFICATE

This is to certify that this is a bonafide record of the Project entitled_____ _____Was done satisfactory a _____by Mr./Ms._____ In partial fulfillment of BCA course. He/ She has successfully completed all the subjects.

This report has not been submitted for any other examination and does not form part of any other course undertaken by the candidate.

Place:

Date:

Signature

Name:

Designation:

(Name & Seal of Supervisor)

PROFORMA FOR THE PROJECT REPORT

1. Title of the Project
2. Objectives
3. Input to the Project
4. Output generated
5. Details of Hardware Platform used
6. Details of Software Tools used
7. Implementation Issues (Clearly defining the area of Application).
8. Miscellaneous
9. Signature of the Candidature.

GUIDELINES FOR THE CHAPTERS AND SECTIONS

1. Microscopic Summary
2. Details of candidate and Supervisor along with certificates of:
   - Original Work;
   - Assistance if any;
   - Credits.
3. Aims and Objectives
4. Approach to Project and Time Frame
5. Project Design Description with Appendices to cover:
   - Flow Charts/Data Flow Diagram-Macro/Micro level
   - Source Code
   - Hardware Platform
   - Software Tools
   - Security measures
   - Quality Assurance Auditability
6. Test Data and Result.