Guru Nanak Institute of Technology

Department of Computer Applications

Curriculum

for

Bachelor of Computer Applications (BCA)

Regulation – 24

(Under Autonomy)

GURU NANAK INSTITUTE OF TECHNOLOGY

157/F, Nilgunj Road, Sodepur, Kolkata-114

Affiliated to -

Maulana Abul Kalam Azad University of Technology

(Formerly known as WBUT)

Guru Nanak Institute of Technology

Department of Computer Applications

Program Structure							
SEMESTER	**THEORY**		**PRACTICAL**		**SESSIONAL**		**Semester wise Credits [A+B+C]**
	Courses	**Credits [A]**	**Courses**	**Credits [B]**	**Courses**	**Credits [C]**	
I	5	13	2	4	2	5	22
II	5	13	2	4	2	5	22
III	5	15	2	4	1	2	21
IV	6	17	1	2	0	0	19
V	4	12	2	4	1	4	20
VI	5	16	2	4	0	0	20
VII	5	15	1	2	1	3	20
VIII	2	8	2	4	1	8	20
TOTAL CREDIT							**164**

Guru Nanak Institute of Technology

Department of Computer Applications

Credit Distribution												
Category	**Sem – 1**	**Sem – 2**	**Sem – 3**	**Sem – 4**	**Sem – 5**	**Sem – 6**	**Total Credit to obtain UG Degree (Category Wise)**	**Credit Allocation as per NEP to obtain UG Degree**	**7th Sem**	**8th Sem**	**Total Credit (Category Wise)**	**Credit Allocation as per NEP**
Core Course (CC)	**10**	**10**	**10**	**11**	**12**	**10**	**63**	**60**	**8**	**12**	**83**	**80**
Discipline Specific Elective (DSE)	**2**	**2**	**3**	**6**	**4**	**6**	**23**	**24**	**9**	**0**	**32**	**32**
Multi-Disciplinary Elective Course(MEC)	**3**	**3**	**3**	**0**	**0**	**0**	**9**	**9**	**0**	**0**	**9**	**9**
Ability Enhancement Course (AEC)	**2**	**2**	**3**	**2**	**0**	**0**	**9**	**8**	**0**	**0**	**9**	**8**
Skill Enhancement Course (SEC)	**2**	**2**	**2**	**0**	**0**	**4**	**10**	**9**	**0**	**0**	**10**	**9**
Value Added Courses (VAC)	**3**	**3**	**0**	**0**	**0**	**0**	**6**	**6 to 8**	**0**	**0**	**6**	**6 to 8**
Internship (INT)	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**2 to 4**	**0**	**0**	**4**	**2 to 4**
Research Project (RP)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-**	**3**	**8**	**11**	**12**
Total Credit (Semester Wise)	**22**	**22**	**21**	**19**	**20**	**20**	**124**	**120**	**20**	**20**	**164**	**160**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-I

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-101	Digital Electronics	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-102	Programming for Problem Solving through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-103	Principles of Management	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-104	English & Professional Communication	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets A or D	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-191	Digital Electronics Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-192	Programming for Problem Solving Lab	0	0	4	4	2
SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-181	Life Skills & Personality Development	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-182A	Yoga	0	0	6	6	3
	Value Added Courses (VAC)	BCA24-VAC-182B	Health & Wellness	0	0	6		
	Value Added Courses (VAC)	BCA24-VAC-182C	Sports	0	0	6		
Total Credit								**22**
Total Contact Hours								**29**

**** For Course Code - refer GE basket papers**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-II								
SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-201	Computer Architecture	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-202	Basics of Web Design Using Html, CSS, Java Scr	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-203	Organization Behaviour	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-204	Modern Indian Languages and Literature	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets B or E	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-291	Computer Architecture Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-292	Basics of Web Design Using Html, CSS, Java Scr	0	0	4	4	2
SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-281	IT Skills	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-282A	Critical Thinking	0	0	4	6	3
	Value Added Courses (VAC)	BCA24-VAC-282B	NSS	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282C	Mental Health	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282D	Environmental Studies	0	0	4		
Total Credit								**22**
Total Contact Hours								**29**

**** For Course Code - refer GE basket papers**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-III

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-301	Python Programming	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-302	Data Structure through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-303	Principles of Marketing	2	1	0	3	3
4	Ability Enhancement Courses (AEC)	BCA24-AEC-304	The Constitution, Human Rights and Law	2	1	0	3	3
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets C or F	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-391	Python Programming Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-392	Data Structure Lab	0	0	4	4	2
SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-381	Understanding Basics of Cyber Security	0	0	4	4	2
Total Credit								**21**
Total Contact Hours								**27**

**** For Course Code - refer GE basket papers**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-IV								
SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-401	Data Base Management System	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-402	Operating System	2	1	0	3	3
3	Core Courses (CC)	BCA24-CC-403	Software Engineering	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-404	Human resource Management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-405	E-Commerce	2	1	0	3	3
6	Ability Enhancement Courses (AEC)	BCA24-AEC-406	Society Culture and Human Behavior	2	0	0	2	2
PRACTICAL								
7	Core Courses (CC)	BCA24-CC-491	DBMS Lab	0	0	4	4	2
		Total Credit						**19**
Total Contact Hours								**21**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-V								
SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-501	PHP WITH MYSQL	3	1	0	4	4
2	Core Courses (CC)	BCA24-CC-502	Object Oriented Programming with Java	3	1	0	4	4
3	Discipline Specific Elective (DSE)	BCA24-DSE-503	Entrepreneurship	2	0	0	2	2
4	Discipline Specific Elective (DSE)	BCA24-DSE-504	Financial management	2	0	0	2	2
PRACTICAL								
5	Core Courses (CC)	BCA24-CC-591	PHP WITH MYSQL LAB	0	0	4	4	2
6	Core Courses (CC)	BCA24-CC-592	Object Oriented Programming with Java Lab	0	0	4	4	2
SESSIONAL								
7	Internship (INT)	BCA24-INT-581	Industrial Internship			4	4	4
		Total Credit						**20**
Total Contact Hours								**24**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VI

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-601	Advance Java With Web Application	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-602	Unix and Shell Programming	2	1	0	3	3
3	Skill Enhancement Courses (SEC)	BCA24-SEC-603	Networking	3	1	0	4	4
4	Discipline Specific Elective (DSE)	BCA24-DSE-604	Customer relationship management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-605	Career planning and management	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-691	Advance Java With Web Application Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-692	Unix and Shell Programming Lab	0	0	4	4	2
Total Credit								**20**
Total Contact Hours								**24**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VII								
SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-701A	Data Mining & Data Warehousing	2	1	0	3	3
	Core Courses (CC)	BCA24-CC-701B	Machine Learning	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701C	Pattern Recognition	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701D	Algorithm Analysis	2	1	0	3	
2	Core Courses (CC)	BCA24-CC-702	Cyber Security	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-SEC-703	Research Methodology	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-704	Consumer Behavior	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-705	Strategic management	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-791A	Data Mining & Data Warehousing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-791B	Machine Learning Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791C	Pattern Recognition Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791D	Algorithm Analysis Lab	0	0	4	4	
SESSIONAL								
7	Research Project (RP)	BCA24-RP-781	Project -1	0	0	6	6	3
Total Credit								**20**
Total Contact Hours								**25**

Guru Nanak Institute of Technology

Department of Computer Applications

CURRICULUM

Course : Bachelor of Computer Applications (BCA)

Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VIII								
SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-801A	Cloud Computing	3	1	0	4	4
	Core Courses (CC)	BCA24-CC-801B	Block ChainTechnology	3	1	0	4	
	Core Courses (CC)	BCA24-CC-801C	Artif icial Intelligence	3	1	0	4	
2	Core Courses (CC)	BCA24-CC-802	Statistical Analysis with R Programming	3	1	0	4	4
PRACTICAL								
3	Core Courses (CC)	BCA24-CC-891A	Cloud Computing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-891B	Block Chain Technology Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-891C	Artif icial Intelligence Lab	0	0	4	4	
4	Core Courses (CC)	BCA24-CC-892	Statistical Analysis with R Programming Lab	0	0	4	4	2
SESSIONAL								
5	Skill Enhancement Courses (SEC)	BCA24-SEC-881	Research Project – 2	0	0	16	16	8
Total Credit								**20**
Total Contact Hours								**32**

Guru Nanak Institute of Technology

Department of Computer Applications

Syllabus of BCA
(Effective from 2024-25 Academic Sessions)

SEMESTER – I

SUBJECT NAME: Digital Electronics

SUBJECT CODE: BCA24-CC-101

CREDIT: 3

CONTACT HOURS : 2 L + 1 T

COURSE OBJECTIVE:

The objective of the course "Digital Electronics" is to provide students with a comprehensive understanding of the principles, theory, and practical applications of digital circuits and systems. Throughout the course, students will explore the foundational concepts of digital electronics, enabling them to design, analyze, and troubleshoot digital circuits commonly used in various electronic devices and systems.

COURSE OUTCOME	
CO1	To gain basic knowledge of digital electronics circuits and its levels.
CO2	To understand and examine the structure of various number system and its conversation.
CO3	To learn about the basic requirements for a design application
CO4	To enable the students to understand, analyze and design various combinational and sequential circuits
CO5	To understand the logic functions, circuits, truth table and Boolean algebra expression

Guru Nanak Institute of Technology

Department of Computer Applications

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	HOURS	MARKS
M1	Number Systems & Codes Decimal Number, Binary Number, Octal Number, Hexadecimal Number, Conversion – Decimal to Binary, Binary to Decimal, Octal to Binary, Binary to Octal, Hexadecimal to Binary, Binary to Hexadecimal, Octal to Binary to Hexadecimal, Hexadecimal to Binary to Octal; Floating Point Number Representation, Conversion of Floating Point Numbers, Binary Arithmetic, 1's and 2's Complement, 9's and 10's Complement, Complement Arithmetic, BCD, BCD addition, BCD subtraction, Weighted Binary codes, Non-weighted codes, Parity checker and generator, Alphanumeric codes.	5	10
M2	Logic Gates : OR, AND, NOT, NAND, NOR, Exclusive – OR, Exclusive – NOR, Mixed logic.	2	10
M3	Boolean Algebra: Boolean Logic Operations, Basic Law of Boolean Algebra, Demorgan's Theorem, Principle of Duality.	6	10
M4	Minimization Techniques Sum of Products, Product of Sums, Karnaugh Map [up to 4 variables].	4	10
M5	Multilevel Gate Network Implementation of Multilevel Gate Network, Conversion to NAND-NAND and NOR-NOR Gate Networks.	2	5
M6	Arithmetic Circuits Half Adder, Full Adder, Half Subtractor, Full Subtractor, Carry Look Ahead Adder, 4-Bit Parallel Adder	5	5
M7	Combinational Circuits Basic 2-input and 4-input multiplexer, Demultiplexur, Basic binary decoder, BCD to binary converters, Binary to Gray code converters, Gray code to binary converters, Encoder.	5	5
M8	Sequential Circuits Introduction to sequential circuit, Latch, SR Flip Flop, D Flip Flop, T Flip Flop, JK Flip Flop, Master Slave Flip Flop	8	5

M9	Basics of Counters Asynchronous [Ripple or serial] counter, Synchronous [parallel] counter	4	5
M10	Basics of Registers SISO, SIPO, PISO, PIPO, Universal Registers	4	5
	sub total	45	70
	Internal examination	3	30
	TOTAL	48	100

SUGGESTED READING:

- "Digital Design" by M. Morris Mano and Michael D. Ciletti Publisher: Pearson India Education Services Pvt. Ltd.
- "Digital Fundamentals" by Thomas L. Floyd and R. David Maki Publisher: Pearson India Education Services Pvt. Ltd.
- "Digital Electronics: Principles, Devices and Applications" by Anil K. Maini Publisher: John Wiley & Sons (Asia) Pte. Ltd.
- "Digital Electronics: A Practical Approach" by William Kleitz Publisher: Pearson India Education Services Pvt. Ltd.
- "Digital Logic Design" by Brian Holdsworth and Clive Woods Publisher: Pearson India Education Services Pvt. Ltd.
- "Digital Electronics: Principles and Applications" by Roger L. Tokheim Publisher: McGraw-Hill Education (India) Pvt. Ltd.
- "Fundamentals of Digital Logic with VHDL Design" by Stephen Brown and Zvonko Vranesic Publisher: McGraw-Hill Education (India) Pvt. Ltd.
- "Digital Electronics: A Primer" by Michael J. Ciletti Publisher: Pearson India Education Services Pvt. Ltd.
- "Analog Circuits" by A.K. Maini, Khanna Book Publishing Co.
- "Design of Analog Circuits" by A.V.N. Tilak, Khanna Book Publishing Co.

Guru Nanak Institute of Technology

Department of Computer Applications

SUBJECT NAME: Programming for Problem Solving through C

SUBJECT CODE: BCA24-CC-102

CREDIT: 3

CONTACT HOURS : 2 L + 1 T

COURSE OBJECTIVE:

The objective of the course "Programming for Problem Solving through C" is to equip students with fundamental programming skills using the C programming language and foster a problem-solving mindset. Throughout the course, students will develop a solid foundation in computer programming concepts and techniques, enabling them to tackle real-world problems and develop efficient, structured, and modular solutions.

COURSE OUTCOME	
CO1	Apply programming constructs of C language to solve the real world problem
CO2	To implement conditional branching, iteration and recursion
CO3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting
CO4	Explore user-defined data structures like structures, unions and pointers in implementing solutions
CO5	Create problem-solving solutions utilizing modular programming elements and functions.
CO6	Use files to store information after solving the problem related to the real world

DETAILED SYLLABUS:

Module No:	**NAME OF THE TOPIC**	**HOURS**	**MARKS**
M1	**Introduction to components of a computer system**: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker. Representation of Algorithm, Flowchart, Pseudo code with examples, From algorithms to programs, source code. Compilation process of C program; .asm file, .obj file and .exe file. Number Systems: Binary, Octal, Decimal, Hexadecimal format.	4	5
M2	**Introduction to 'C' Language**: C Language - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.	4	2

M3	**Conditional Statements and loops :** Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming	7	15
M4	**Arryays:** One dimensional arrays: Array manipulation; Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in an array; Two dimensional arrays, Addition/Multiplication of two matrices, Transpose of a square matrix; Null terminated strings as array of characters, Standard library string functions	8	15
M5	**Pointers :**Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays, pointers and structures, dynamic memory allocation.	8	8
M6	**Functions:** Top-down approach of problem solving, Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments. **Storage Classes :** Scope and extent, Storage Classes in a single source file: auto, extern and static, register, Storage Classes in a multiple source files: extern and static	8	15
M7	**File Processing** : Concept of Files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file	6	10
	INTERNAL EXAMINATION	3	30
	TOTAL	48	100

SUGGESTED READING:

- "AICTE's Programming for Problem Solving" by Khanna Book Publishing Co.
- "Let Us C" by Yashavant Kanetkar Publisher: BPB Publications
- "C Programming: A Modern Approach" by K. N. King Publisher: W. W. Norton & Company India Pvt. Ltd.

- "C Programming for the Absolute Beginner" by Perry, Greg Publisher: Course Technology PTR (Cengage Learning)
- "C How to Program" by Deitel, Paul, and Deitel, Harvey Publisher: Pearson Education India
- "Programming in ANSI C" by Kochan, Stephen G. Publisher: Pearson Education India
- "C Primer Plus" by Prata, Stephen Publisher: Pearson Education India
- "C Programming Absolute Beginner's Guide" by Perry, Greg Publisher: Pearson Education India
- "Programming with C" by Gottfried, Byron S. Publisher: Tata McGraw-Hill Education

SUBJECT NAME: Principles of Management

SUBJECT CODE: BCA24-DSE-103

CREDIT: 2

CONTACT HOURS : 2 L

COURSE OBJECTIVE:

Sl. No.	Course Objective	
1	To help the students to develop cognizance of the importance of management principles.	
2	To enable them to analyze and understand the environment of the organization.	
3	To study the all-management functions of organization.	
4	To enable them to understand the structure and changes of the organization.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Students will be able to have clear understanding of managerial functions, theories and same basic knowledge on management.	U1
CO 2	Students will be able to have clear understanding planning function in detail.	U1,U2
CO 3	Students will be able to have clear understanding of organization structure.	U2,U3
CO 4	Students will be able to have clear understanding of how to lead and motivate.	U3,U4
CO 5	Students will be able to have clear understanding of managerial change and resistance.	U5

Learning Outcome/Skills:

The candidate will be able to focus on the critical domains of management, planning and decision making moreover he will he will gain the expertise on the organisational skills leading and motivation and the techniques adopted for controlling and resisting the managerial skills.

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	Introduction to Management • Definition and nature of management • Evolution of management theories • Functions of management (planning, organizing, leading, controlling) • Roles and skills of managers • Managerial levels and hierarchy	**10**
Unit-II	Planning and Decision Making • Importance and benefits of planning • Types of plans (strategic, tactical, operational) • Steps in planning • Environmental scanning • Decision-making process and techniques	**10**
Unit-III	Organizing • Organizational structure • Departmentalization and span of control • Authority, responsibility, and delegation	**8**
Unit-IV	Leading and Motivating • Leadership-- definition and styles • Communication and its importance • Motivation theories	**8**
Unit-V	Controlling and resistance to management • Elements of control process • Types of control (feedforward, concurrent, feedback) • Concept of resistance to change • Overcoming resistance to change	**9**
	Total	**45**

SUBJECT NAME: English & Professional Communication

SUBJECT CODE: BCA24-AEC-104

CREDIT: 2

CONTACT HOURS : 2 L

COURSE OBJECTIVE:

Sl. No.	**Course Objective**	
1	To lay emphasis on the development of linguistic competence and honing skills in the domain of communication and its allied affairs.	
	Course Outcomes	**Mapped module/Unit**
CO 1	To improve communicative competence of the students.	U1
CO 2	To enable the students converse in the real-life situations.	U1, U2
CO 3	To make the effective use of English for practical purposes.	U1, U2, U3
CO 4	To enable the students, acquire phonetic skills.	U1, U3, U4

Learning Outcome/Skills:

The candidate will be able to have a deep insight into the areas of grammar, communication, reading aspects and practical skills and preparation to face the corporate world and the general life with confidence. There should be a close linkage between the various elements of language and communication for a flawless reflection.

.

.

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	Grammar: Tense, Voice, Phrases and Clauses, Narration, Transformation of Sentences, Vocabulary.	**6**
Unit-II	Communication: Definition, importance, purpose, elements, barriers, body language and strategies.	**8**
Unit-III	Reading Skills: Purpose, Articulation, Syllables, Accent and Voice Modulation.	**7**
Unit-IV	Presentation Skills, its structure, speech preparation, public speaking on special occasion. Interview, types, Group Discussion, Mock Sessions for practice.	**9**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
K C Verma	The Art of Communication	Kalpaz Publication.
B K Mitra	Personality Development and Soft Skills	Oxford Publication
Wren and Martin	High School Grammar and Composition, Wren and Martin	S Chand Publication

SUBJECT NAME: Digital Electronics Lab

SUBJECT CODE: BCA24-CC-191

CREDIT: 2

CONTACT HOURS : 4 P

List of Practicals

- Realization of basic gates using Universal logic gates.
- Code conversion circuits- BCD to Excess-3 and vice- versa.3 Four-bit parity generator andcomparator circuits.
- Construction of simple Decoder and Multiplexer circuits using logic gates.
- Design of combinational circuit for BCD to decimal conversion to drive 7-segment display using multiplexer.
- Construction of simple arithmetic Circuits-Adder, Subtractor.
- Realization of RS-JK and D flip-flops using Universal logicgates.
- Realization of Universal Register using JK flip-flops and logicgates.
- Realization of Universal Register using multiplexer and flip-flops.
- Realization of Asynchronous Up/Down counter.
- Realization of Synchronous Up/Down counter.
- Realization of Ring counter and Johnson's counter.
- Construction of adder circuit using Shift Register and full Adder.

SUBJECT NAME: Programming for Problem Solving Lab

SUBJECT CODE: BCA24-CC-192

CREDIT: 2

CONTACT HOURS : 4 P

List of Practical:

- Write a c program to display the word "welcome".
- Write a c program to take a variable int and input the value from the user and displayit.
- Write a c program to add 2 numbers entered by the user and display the result. Write a c program to calculate the area and perimeter of a circle.
- Write a C program to find maximum between two numbers.
- Write a C program to check whether a number is divisible by 5 and 11 or not.
- Write a C program to input angles of a triangle and check whether triangle is valid ornot.
- Write a C program to check whether a year is leap year or not.
- Write a C program to input basic salary of an employee and calculate its Grosssalary according to following:
  Basic Salary <= 10000 : HRA = 20%,DA = 80% Basic
  Salary <= 20000 :
  HRA = 25%, DA = 90% Basic Salary
  > 20000 : HRA = 30%, DA = 95%
- Write a c program to print “welcome” 10 times.
- Write a c program to print first n natural numbers using while loop.
- Write a c program to print all the odd numbers in a givenrange.
- Write a c program to add first n numbers using while loop.
- Write a c program to print all numbers divisible by 3 or 5 in a givenrange.
- Write a c program to add even numbers in a given range.
- Write a c program to find the factorial of a given number.
- Write a c program to find whether a number is prime or not.
- Write a c program to print the reverse of a number.
- Write a c program to add the digits of a number.
- Write a c program to print the fibonacci series in a given range.
- Write a c program to check whether a number is an Armstrong number or not.
- Write a c program to find g.c.d. and l.c.m. of two numbers.
- Write a C program that writes “hello File Handling” to the File.
- Write a C program that reads the information from the file.
- Write a C program that defines a structure for student. Then Create five instance of the student and find who scores the highest marks. Write the information of the student whoscores the highest marks.

SUBJECT NAME: Life Skills & Personality Development

SUBJECT CODE: BCA24-SEC-181

CREDIT: 2

CONTACT HOURS : 2 L

Sl. No.	Course Objective	
1	To understand the importance of the fundamental skill practices of life.	
2	To analyze the necessity of growth and expansion of personality to cater a complete look to life.	
3	To showcase the extreme necessity of the use and application of soft skills in organization.	
4	To comprehend the hand in glove relation between the life skill practices and the subtle nuances of personality.	
	Course Outcomes	**Mapped module/Unit**
CO 1	To enable the students, understand the essence of career growth and improvement of professional skills.	U1
CO 2	To enable the students, realize the importance of attitude and its relation tothe motivational acumen to manage the daily stress issues for a sum total development.	U1, U2
CO 3	To acquire deemed knowledge on the various tentacles of communicativeskills and their subsequent application for a complete reflection.	U1, U2, U3
CO 4	To make the students realize the use and necessity of soft skills in thecorporate domain and job searching scenario.	U1, U3, U4

Learning Outcome/Skills:

The candidate is able to have a detailed understanding of the importance of career and the skills which are high required to pave the path for a distinct destination. There is a perfect blend of the various categories required for the growth and expansion of life and career.

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	Career and Professional Skills: Listening skills, Reading skills, Writing skills, Resume preparation, exploring career opportunities, cognitive skills, presentation skills, social and cultural etiquettes, digital literacy, ethics and security.	**7**
Unit-II	Attitude and Motivation: Attitude: Concept, meaning, types, applicable factors in daily life. Motivation: Concept, meaning, types, causes of de motivation, remedial measures. Stress Management and Development of Capabilities: Stress: meaning, causes, solutions. Development of Capacities: Leadership qualities, time management, decision making, team work, work ethics, good manners and etiquettes.	**8**
Unit-III	Introduction to Soft Skills: Personal Skills, knowing oneself, confidence building, defining strengths and weaknesses, developing positive attitude, thinking positively, perceptions, values in daily life. Inter and Intra personal skills, Group Dynamics, the importance of a good networking system, troubleshooting method and problem solving tools and techniques.	**9**
Unit-IV	The various branches of Communication Skills: Reading texts, Speaking fluently, Writing effectively. E mail writing and etiquettes followed. Corporate and Job hunting Skills: The Behavioral etiquettes, mannerisms, Stress Management, Time Management, importance of proper body language, writing a good CV (with job application), career planning, importance of goal settings in different spheres and conducting of mock GD.	**6**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Meena and V. Ayothi (2013)	A Book on Development of Soft Skills	PR Publisher and Distributor
Patra Avinash	The Spiritual Life and Culture of India	London, OUP.
Shiv Khera	You can win	MacMillan Books, New York, 2003.
B K Mitra	Personality Development and Soft Skills	Oxford Publication.
Alex K	Soft Skills - Know Yourself and Know yourWorld	S Chand and Company Ltd.

SUBJECT NAME: Yoga

SUBJECT CODE: BCA24-VAC-182A

CREDIT: 3

CONTACT HOURS : 6 P

Sl. No.	**Course Objective**	
1	To impart the students with basic concepts of Yoga for health and wellness.	
2	To familiarise the students with health-related Yoga for Overall growth & development	
3	To create a foundation for the professionals in Yoga.	
4	To impart the basic knowledge and skills to teach Yoga activities.	
	Course Outcomes	**Mapped module/Unit**
CO 1	To explain the meaning of Yoga, & its importance.	U1
CO 2	To know the classification of Yoga & its values	U1
CO 3	To know the different yogic practices and their significance. To understandthe effects of kriyas, pranayam and asanas on our body.	U2
CO 4	To comprehend the concept of health, healing, and disease by the influenceof Yoga	U3
CO 5	To know the way of Stress management through Yoga and Yogic dietary considerations.	U3
CO 6	To know the need of Yoga for healthy living & Effects of Meditation on our body.	U3

Learning Outcome/Skills:

The candidate is able to understand the tenets of the theory of yoga, the forms and the application in the regular life to keep the health fit and fine. The candidate will be able to gain the expertise on the various postures of yoga in the accepted sense of term.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Practical	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	**Introduction to Yoga** Concept & principles, aims and objectives, classifications, Role of Yoga in character building, Therapeutic values of Yoga, Role of Yoga practices in developing concentration, will power and discipline, Difference between Yoga Asana and physical exercises, Importance of Yoga in daily life.	**12**
Unit-II	**Asanas, Kriya & Pranayam** Positions of Asanas: Guidelines, importance and limitations. Standing, Sitting, Supine, Proline and Balancing Asanas. (Any three asanas from each)	**12**
	Definitions of kriyas, Types, brief ideas of each kriya and importance. Pranayam: Definition, guidelines for the practice of pranayama, importance, limitations	
Unit-III	**Yoga and Health** Need of Yoga for health, concept of health and healing: yogic perspectives Yogic principles of healthy living and the role of Yoga in stress management and yogic dietary considerations	**8**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Nagendra, H. R. & Nagarathna,R.	Samagra Yoga Chikitse	Bengaluru: Swami Vivekananda Yoga Prakasana
Kumar, Ajith	Yoga Pravesha	Bengaluru: Rashtrothanna Prakashana
D.M Jyoti	Yoga and Physical Activities	lulu.com3101, Hills borough,NC27609, United State

SUBJECT NAME: Health & Wellness

SUBJECT CODE: BCA24-VAC-182B

CREDIT: 3

CONTACT HOURS : 6 P

Sl. No.	**Course Objective**	
1	To help understand the importance of a healthy lifestyle	
2	To familiarize students about physical and mental health	
3	To create awareness of various lifestyle related diseases	
4	To provide understanding of stress management	
	Course Outcomes	**Mapped module/Unit**
CO 1	Explain the meaning of health & wellness and its importance.	U1
CO 2	Role of essential components in balanced diet for good health	U1
CO 3	Role of healthy food for prevention of various disease	U2
CO 4	Effect of exercise on hypokinetic disease	U2
CO 5	Stress management through Yoga	U3
CO 6	Importance of sleep on mental and physical health	U3

Learning Outcome/Skills:

The candidate will be able to understand the importance of wellbeing and the path which would help to manage a healthy lifestyle, keeping the negative factors at bay. There is a huge possibility of the practical approach of health style and fitness.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Practical	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	**Introduction to Health and Wellness** • Define and differentiate health and wellness. • Importance of health and wellness Education. • Local, demographic, societal issues and factors affecting health and wellness. • Diet and nutrition for health & wellness. • Essential components of balanced diet for healthy living with specific reference to the role of carbohydrates, proteins, fats, vitamins & minerals. • Malnutrition, under nutrition and over nutrition. • Processed foods and unhealthy eating habits. • Body systems and common diseases. • Sedentary lifestyle and its risk of disease.	**15**
Unit-II	**Management of Health & Wellness** • Healthy foods for prevention and progression of Cancer, Hypertension, Cardiovascular, and metabolic diseases (Obesity, Diabetes, Polycystic Ovarian Syndrome). • Types of Physical Fitness and its Health benefits. • Modern lifestyle and hypo-kinetic diseases; prevention and management through exercise. • Postural deformities and corrective measures.	**10**
Unit-III	**Anxiety, Stress and Aging** • Meaning of Anxiety, Stress and Aging • Types and Causes of Stress • Stress relief through Exercise and Yoga • Role of sleep-in maintenance of physical and mental health.	**5**
	Total	**30**

List of Books

Name of Author	Title of the Book
Steven N. Blair, William L. Haskell	Physical Activity and Health
Emily Attached & Marzia Fernandez	Mental Health Workbook
Nashay Lorick	Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve Well-Being
C. Nyambichu & Jeff Lumiri	Lifestyle Diseases: Lifestyle Disease Management
Angela Clow & Sarah Edmunds	Physical Activity and Mental Health

SUBJECT NAME: Sports

SUBJECT CODE: BCA24-VAC-182C

CREDIT: 3

CONTACT HOURS : 6 P

Sl. No.	Course Objective	
1	To help understand the importance of sports.	
2	To familiarise students about sports and mental health	
3	To provide understanding of conditioning of exercise	
4	To provide understanding of stress management	
5	To gain knowledge about event management	
	Course Outcomes	**Mapped module/Unit**
CO 1	Explain the meaning of sports & physical education and its importance.	U1
CO 2	Role of sports in daily life	U1
CO 3	Types of exercises and activities for healthy lifestyles	U2
CO 4	Concept of sports event management	U3
CO 5	Concept of Traditional games	U3

Learning Outcome/Skills:

The candidate will be able to gain a clear conception on the importance of sports, types, managerial techniques and their relevant applications in the practical domain. Through intense practice the candidate will be able to gain an expertise in sports and its adjoining areas.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Practical	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	**Introduction to Sports** Meaning and definition of Sports. Aims, Objectives and Importance of Sports. Modern trends of Sports Brief concept of Education in relation to Sports	**8**
Unit-II	**Physical Education & Sports** General warmup exercises Specific warmup exercises Conditioning Relaxation Techniques Cardiac Exercise Exercises/Activities for stress management Assessment of BMI	**10**
Unit-III	**Sports Event Management** Meaning, Definition and importance of Sports Management Scope of Sports Event Management Principles of Sports Event Management Major and Minor Sports Events Traditional Games Management	**12**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Coalter, F.	Sport for Development: What game are we playing?	Routledge.
Singh Hardayal	Science of Sports Training	DVS Publication, New Delhi
Muller, J. P.	Health, Exercise and Fitness	Delhi: Sports

Syllabus of BCA
(Effective from 2024-25 Academic Sessions)

SEMESTER – II

SUBJECT NAME: Computer Architecture

SUBJECT CODE: BCA24-CC-201

CREDIT: 3

CONTACT HOURS : 2 L + 1 T

COURSE OBJECTIVE:

The objective of the course "Computer Architecture" is to provide students with a comprehensive understanding of the fundamental principles, components, and design principles that govern modern computer systems. Throughout the course, students will delve into the intricate workings of computer hardware, its organization, and how it interacts with software. The main goals are to enable students to grasp the inner workings of computers, analyze their performance, and make informed design decisions for efficient and reliable computing systems.

COURSE OUTCOME	
CO1	To enable the students to understand the functionality and implementation of computer system.
CO2	To familiarize with the various instruction codes and formats of different CPUs.
CO3	To introduce the students to I/O and memory organization of computer system
CO4	To deliver an overview of Control Unit of a computer system
CO5	To learn the usage of parallel and vector processing.

Guru Nanak Institute of Technology

Department of Computer Applications

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	HOURS	MARKS
M1	Data Representation: Number Systems – decimal, binary, octal, hexadecimal, alphanumeric representation, 2. Complements – 1's complement, 2' complement, 9's complement, 10' complement, [r-1]'s complement, r's complement, 3. Fixed point representation – Integer representation, arithmetic addition, arithmetic subtraction, overflow, decimal fixed point representation, 4. Floating point representation, 5. IEEE 754 floating point representation	**4**	**5**
M2	Computer arithmetic: Addition algorithm of sign magnitude numbers, Subtraction algorithm of sign magnitude numbers, Addition algorithm of signed 2's complement data, Subtraction algorithm of signed 2's complement data, Multiplication algorithm, Booth's algorithm, Division algorithm	**4**	**5**
M3	Register transfer and micro-operations: Register transfer language, Register transfer, Bus system for registers, Memory transfers – memory read, memory write, Micro operations – register transfer micro operations, arithmetic micro operations, logic micro operations, shift micro operations, Binary adder, binary adder subtractor, binary incrementer, arithmetic circuit for arithmetic micro operations, One stage logic circuit, Selective set, Selective complement, Selective clear, ask, Insert, Clear	**5**	**5**
M4	Basic Computer organization and design: Instruction codes, Direct address, Indirect address & Effective address, List of basic computer registers, Computer instructions: memory reference, register reference & input – output instructions, Block diagram & brief idea of control unit of basic computer, Instruction cycle	**4**	**5**
M5	Micro programmed control: Control memory, Address sequencing, Micro program examples	**4**	**5**

M6	Central processing unit: General register organization, Stack organization, Register stack, Memory stack, Stack operations – push & pop, Evaluation of arithmetic expression using stack, Instruction format, Types of CPU organization [single accumulator, general register & stack organization] & example of their instructions, Three, two, one & zero address instruction, Definition and example of data transfer, data manipulation & program control instructions, Basic idea of different types of interrupts [external, internal & software interrupts], Difference between RISC & CISC	**6**	**5**
M7	Pipeline and vector processing: Parallel processing, Flynn's classification, Pipelining, Example of pipeline, space time diagram, speedup, Basic idea of arithmetic pipeline, example of floating point addition/ subtraction using pipeline	**6**	**10**
M8	Input – output organization: Peripheral devices, Input – output interface, Isolated I/O, Memory mapped I/O, Asynchronous data transfer: strobe & handshaking, Programmed I/O, Interrupt initiated I/O, Basic idea of DMA & DMAC Input – output processor	**6**	**10**
M9	Memory organization: Memory hierarchy, Main memory definition, types of main memory, types of RAM, ROM, difference between SRAM & DRAM, Cache memory, Cache memory mapping – Direct, Associative, Set Associative, CAM, hardware organization of CAM, Virtual memory, mapping using pages, page fault, mapping using segments, TLB, Auxiliary memory, diagrammatic representation of magnetic disk & hard disk drive, Definitions of seek time, rotational delay, access time, transfer time, latency	**6**	**20**
	INTERNAL EXAMINATION	**3**	**30**
	TOTAL	**48**	**100**

SUGGESTED READING:

- V. Carl, G. Zvonko and S. G. Zaky, "Computer organization", McGraw Hill, 1978.
- B. Brey and C. R. Sarma, "The Intel microprocessors", Pearson Education, 2000.
- J. L. Hennessy and D. A. Patterson, "Computer Architecture A Quantitative Approach", Morgan Kauffman, 2011.
- W. Stallings, "Computer organization", PHI, 1987.
- M. Morris Mano "Computer System Architecture " PEARSON
- Rajaraman – "Computer Organization & Architecture", PHI
- B.Ram – "Computer Organization & Architecture", Newage Publications
- J.P. Hayes " Computer Architecture & Organisation", TATA MCGRAW HILL

Guru Nanak Institute of Technology

Department of Computer Applications

SUBJECT NAME: Basics of Web Design Using Html, CSS, Java Script

SUBJECT CODE: BCA24-CC-202

CREDIT: 3

CONTACT HOURS : 2 L + 1 T

COURSE OBJECTIVE:

The objective of the course "Basics of Web Design Using HTML, CSS, JavaScript, and Web Hosting" is to provide students with a solid foundation in web development, enabling them to create and publish static websites. Throughout the course, students will learn essential technologies and techniques for designing and building web pages, as well as the basics of hosting and deploying websites on the internet. By the end of the course, students should be proficient in creating static websites using HTML, CSS, and JavaScript, and have a clear understanding of web hosting and deployment procedures.

COURSE OUTCOME	
CO1	To gain knowledge about the protocols used in various services of internet.
CO2	Use different HTML components for designing the Web page for solving real world application
CO3	Students can implement modern, responsive, mobile first CSS framework.
CO4	to gain knowlegge about synchronous and asynchronous Java script
CO5	Student knows the different methodologies realted to the hosting web application

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	HOURS	MARKS
M1	Introduction to Web Design: Introduction of Internet, WWW, Website, Working of Websites, Web pages, Front End, Back End, Client and Server Scripting Languages, Responsive Web Designing, Types of Websites (Static and Dynamic Websites), representation of URL format, port number, Http and https protocol, IP addressing Internet Applications: Internet services, Electronic Mail(E-Mail), File Transfer, Real-Time User Communication, Remote Login	4	10

M2	HTML Basics HTML: Introduction, Basic Structure of HTML, Head Section and Elements of Head Section, Formatting Tags: Bold, Italic, Underline, Strikethrough, Div, Pre Tag Anchor links and Named Anchors Image Tag, Paragraphs, Comments, Tables: Attributes –(Border, Cellpadding, Cell spacing , height , width), TR, TH, TD, Rowspan, Colspan Lists : Ordered List , Unordered List , Definition List, Forms,Form Elements, Input types, Input Attributes, Text Input Text Area, Dropdown, Radio buttons , Check boxes, Submit and Reset Buttons Frames: Frameset, nested Frames. HTML 5 Introduction, HTML5 New Elements: Section, Nav, Article, Aside, Audio Tag, Video Tag, HTML5 Form Validations: Require Attribute, Pattern Attribute, Autofocus Attribute, email, number type, date type , Range type, HTML embed multimedia, HTML Layout, HTML Iframe	9	25
M3	CSS: Introduction to CSS, Types of CSS, CSS Selectors : Universal Selector ,ID selector, Tag Selector, Class Selector, Sub Selector, Attribute Selector, Group Selector, CSS Properties: Back Ground properties, Block Properties, Box properties, List properties, Border Properties, Positioning Properties, CSS Lists CSS Tables, CSS Menu Design CSS Image Gallery,	12	20
M4	CSS Framework: Web Site Development using W3.CSS Framework, W3.CSS Intro, W3.CSS Colors, W3.CSS Containers, W3.CSS Panels, W3.CSSBorders, W3.CSS Fonts, W3.CSS Text, W3.CSS Tables, W3.CSS List, W3.CSSImages, W3.CSS Grid	8	20
M5	JavaScript and Angular Js: Introduction to Client Side Scripting Language, Variables in Java Script, Operators in JS, Conditions Statements, JS Popup Boxes, JS Events, Basic Form Validations in JavaScript. Introduction to Angular JS: Expressions, Modules and Directives.	8	18

M6	Web hosting Basics, Documents Interchange Standards, Components of Web Publishing, Document management, Web Page Design Considerations and Principles, Search and Meta Search Engines, WWW, Browser, HTTP, Publishing Tools	4	7
	INTERNAL EXAMINATION	3	30
	TOTAL	48	100

SUGGESTED READING:

- "Learning Web Designing" by Ramesh Bangia, Khanna Book Publishing Co.
- "HTML, CSS, and JavaScript All in One: Covering HTML5, CSS3, and ES6" by Julie C.Meloni and Jennifer Kyrnin Publisher: BPB Publications
- "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and WebGraphics" by Jennifer Niederst Robbins Publisher: O'Reilly Media
- "HTML and CSS: Design and Build Websites" by Jon Duckett Publisher: Wiley IndiaPvt. Ltd.
- "JavaScript and JQuery: Interactive Front-End Web Development" by Jon DuckettPublisher: Wiley India Pvt. Ltd.
- "Web Design with HTML, CSS, JavaScript and jQuery Set" by Jon Duckett Publisher:Wiley India Pvt. Ltd.
- "Head First HTML and CSS: A Learner's Guide to Creating Standards-Based WebPages" by Elisabeth Robson and Eric Freeman Publisher: O'Reilly Media
- "A Smarter Way to Learn HTML & CSS: Learn it faster. Remember it longer." by MarkMyers Publisher: CreateSpace Independent Publishing Platform
- "Web Development and Design Foundations with HTML5" by Terry Felke-MorrisPublisher: Pearson Education India
- "Web Designing & Development" by Tanweer Alam, Khanna Book Publishing.

SUBJECT NAME: Organization Behaviour

SUBJECT CODE: BCA24-DSE-203

CREDIT: 2

CONTACT HOURS : 2 L

COURSE OBJECTIVE:

Sl. No.	Course Objective	
1	Understand the fundamental concepts and theories of organizational behaviour.	
2	Explore group dynamics, teamwork, and decision-making processes within organizations.	
3	Examine the challenges and opportunities of managing diversity and inclusion in organizations.	
4	Analyze the role of leadership, power, and politics in shaping behaviour and organizational outcomes.	
5	Gain insights into global and cross-cultural aspects of organizational behaviours.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Students will be able to have clear understanding of basic and history of Organization behaviour	U1
CO 2	Students will be able to have clear understanding about individual behaviour aspects.	U1,U2
CO 3	Students will be able to have clear understanding about group dynamics	U3
CO 4	Students will be able to have clear understanding about power and political behaviour.	U1,U4
CO 5	Students will be able to have clear understanding of global organization behaviour.	U5

Learning Outcome/Skills:

The candidate will acquire the skill to understand the basic tenets of organizational behaviour individual behaviour group and team dynamics power and political behaviour and international organizational behaviour. This skill will highly enable the candidate to carve a niche in the desired domain.

Chapter	Name of the Topic	Hours
Unit-I	Introduction to Organizational Behaviour • Definition and scope of organizational behaviour • Historical development of organizational behaviour • Importance of studying organizational behavior • Individual behaviour in organizations	10
Unit-II	Individual Behaviour • Personality definition, theories • Perception, attribution, and attitudes • Learning theories • Job satisfaction	10
Unit-III	Group and Team Dynamics • Types of groups in organizations • Stages of group development • Conflict management and negotiation skills	8
Unit-IV	Power and Political behaviour • Definition, • Power Dynamics • Sources • Power tactics • Essence of politics • Types of political activities.	9
Unit-V	International Organizational Behaviour • Definition, nature, characteristics • Cross-cultural differences and their impact on behaviour • Organizational behaviour trends and future challenges	8
	Total	45

List of Books

Sr. No.	Name of Author	Title of the BOOK	Publication
1	K. Aswathappa	Organizational behaviour, Text, Cases and Games	Himalaya Publishing House
2	Stephen P. Robbins	Organizational Behaviour, Eighteen Edition	Pearson
3	Stephen P. Robbins	Essentials of Organizational Behavior, Fourteenth Edition	Pearson
4	Fred Luthans	Organizational behavior: A modern behavioral approach to management	McGraw-Hill
5	Khanka S.S	Organizational Behaviour	S Chand & Company

SUBJECT NAME: Modern Indian Languages and Literature

SUBJECT CODE: BCA24-AEC-204

CREDIT: 2

CONTACT HOURS : 2 L

COURSE OBJECTIVE:

Sl. No.	Course Objective	
1	To understand the basics of the functional grammar, its usage and relevant application.	
2	To understand technique, style, pattern and the logical development of thoughts in writing various different kinds of prose.	
3	To understand the text and the key features associated with the literary aspects of MIL.	
4	To understand the need and development of the structure of the contemporary communication skills and its relevant application.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Enable the students comprehend and grip the fundamentals of English Grammar and its allied features applicable in the world.	U1, U2
CO 2	Enable the students develop the skills for writing prose and essays of variety to widen their mental horizon.	U2, U3
CO 3	Enable the students take interest in the selected literary pieces and their relevance as well as purpose in the modern world.	U3
CO 4	Enable the students develop the expertise in the matter of communication and its practical application to add an extra dimension totheir learning process.	U1, U4

Learning Outcome/Skills:

The candidate will not only have an exposure to the fundamentals of English grammar and writing features but also develop a keen interest in the literary domain linked with the rich communications skills. The use of modern technology in the world of communication will also widen their mental horizon.

Chapter	Name of the topic	Hours
Unit-I	Functional Grammar and its usage: Formation of tenses, gerund, infinitive, verbalnoun, synthesis of sentences, idioms and proverbs.	6
Unit-II	Develop the Writings in a New Pattern and Style: Expository, Descriptive, Reflective, Narrative, Biographical and Autobiographical. Letters (Formal type) and Report Scripting (News Paper style) and Features.	7
Unit-III	Selected Literary Pieces: Poetry: JACK (E V Lucas), SNAKE (D H LAWRENCE). Prose: KITE (Somerset Maugham), THE HUNGRY STONE (RABINDRANATH TAGORE)Drama: TARA (MAHESH DATTANI)	9
Unit-IV	Communication: Debate, Discussion, Public interaction, Safety measures of Communication, Power of Convincing others and Audio-Visual technology used for the contemporary communication system.	8
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Wren and Martin	High School Grammar and Composition	S Chand Publication
Palgrave	Golden Treasury	Oxford Publication
B K Mitra	Personality Development and Soft Skills	Oxford Publication
H.N. Kashyap	A Pageant of Poems (English, Paper back)	Selina Publishers

Link:https://everyvillagehasitsjack.wordpress.com/tag/e-v-lucas/(For the poem Jack by E V Lucas)

SUBJECT NAME: Computer Architecture Lab

SUBJECT CODE: BCA24-CC-291

CREDIT: 2

CONTACT HOURS : 4P

COURSE OBJECTIVE:

List of Practical:

- Basic gates and Universal gates. Implementation of Half & full adder. Half & fullsubtractor,
- 4 bit logical unit, 4 bit arithmetic unit, BCD adder, 4 bit adder/ subtractor, Carrylook ahead adder, Design of ALU for multi bit operation, comparators.
- 8:1 MUX IC verification, 16:1 MUX using IC 74151, dual 2 to 4 Decoder/Demultiplexer IC evaluation. Priority encoder.
- Read/ write operation using RAM IC, Cascading RAM ICs

SUBJECT NAME: Basics of Web Design Using Html, CSS, Java Script Lab

SUBJECT CODE: BCA24-CC-292

CREDIT: 2

CONTACT HOURS : 4P

COURSE OBJECTIVE:

Practical Assignment: Building a Personal Portfolio Website

Objective: The objective of this practical assignment is to apply the concepts learned in the course "Basics of Web Design Using HTML, CSS, and JavaScript" to create a personal portfolio website. The portfolio website will showcase your skills, projects, and accomplishments, and demonstrate your understanding of web design principles, responsivedesign, and JavaScript interactivity.

Requirements: Your personal portfolio website should meet the following criteria:

- Home Page: Create an attractive and informative home page that introduces yourselfand includes a brief summary of your background, skills, and interests.
- About Me Page: Design an "About Me" page that provides more detailed informationabout your education, work experience, and personal interests.
- Projects Page: Showcase your projects with descriptions and images. Use a grid or cardlayout to present the projects neatly.
- Contact Page: Include a contact form or your contact information (email, phonenumber, LinkedIn profile, etc.) to allow visitors to reach out to you.
- Responsive Design: Ensure that your website is responsive and displays correctly onvarious devices, including desktops, tablets, and mobile phones.
- Navigation: Implement a navigation bar or menu that allows visitors to easily navigatebetween different pages of your website.
- CSS Styling: Apply CSS styles to enhance the overall appearance of your website,including fonts, colors, backgrounds, and layout.
- JavaScript Interactivity: Incorporate JavaScript to add interactive elements to yourwebsite, such as a responsive navigation menu, image sliders, or a contact form validation.
- External Resources: Utilize external resources, such as Google Fonts or Font Awesomeicons, to enhance the design and functionality of your website.
- Code Organization: Organize your HTML, CSS, and JavaScript code into separate filesand link them appropriately in your web pages.
- Valid HTML and CSS: Ensure that your HTML and CSS code is valid, following W3Cstandards.

SUBJECT NAME: IT Skills

SUBJECT CODE: BCA24-SEC-281

CREDIT: 2

CONTACT HOURS : 2L

Sl. No.	Course Objective	
1	To understand the usage of various IT tools and software applications commonly used in business environments.	
2	Understand the role and importance of IT tools in enhancing productivity, efficiency, and communication in business operations.	
3	To understand the utilization of IT tools for data management, analysis, and reporting to support decision-making processes.	
4	To understand CRM and technologies such as SEO and use it for business advancement.	
5	To understand the importance of cyber security and IT governance.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Students should have a good knowledge on range of IT tools and software applications to support and enhance business operations.	U1
CO 2	Students should have a good knowledge to streamline processes, improve productivity, and optimize resource utilization in businesssettings.	U1, U2
CO 3	Students should have a good knowledge to utilize data management and analysis skills acquired through IT tools to make informed decisions and drive business performance.	U1, U2, U3
CO 4	Students should have a good knowledge of CRM and technologies such as SEO.	U1, U3, U4
CO 5	Students should have a good knowledge of basic of cyber security and IT governance in India.	U5

Learning Outcome/Skills:

The candidate will be able to have an overview of the use of various IT tools and their corresponding business important apart from gaining knowledge on the other relevant areas of marketing, HR, cyber security and IT governance. This put further prepare the candidate for a more rational and practical approach.

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	Introduction to IT Tools in Business: Overview of IT tools and their importance in business, Role of IT tools in enhancing productivity and efficiency, Operating systems and software applications used in business, Introduction to internet and its impact on business, Overview of business information systems and databases, Introduction to ERP and its usages, ERP systems (e.g., SAP, Oracle, Microsoft Dynamics).	**7**
Unit-II	Communication and Collaboration Tools: Email communication and management, Instant messaging and online chat tools, Video conferencing and web conferencing tools, Document sharing and version control tools, Virtual team communication and coordination.	**5**
Unit-III	Data Management and Analysis Tools: Introduction to spreadsheets and data analysis, Advanced features of spreadsheet software (e.g., formulas, functions, pivot tables), Database management systems and their role in business, Business intelligence and data analytics tools.	**6**
Unit-IV	Marketing, HR Tools: Customer relationship management (CRM) systems, Marketing automation tools, Email marketing tools, HRIS (Human Resource Information System) concept and tools, Web analytics and search engine optimization (SEO) tools.	**6**
Unit-V	Cybersecurity and IT Governance: Importance of cybersecurity in business, Types of cyber threats and attack vectors, Network security and firewalls, Data encryption and secure communication, Risk assessment and management, IT governance frameworks and compliance standards.	**6**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Mayank Bhusan Rajkumar Singh Rathore Aatif Jamshed	Fundamentals of Cyber Security (Principle, Theory and Practices)	BPB Publications
Nippani K.S	Digital India Governance Transformation	Nippani K.S
Nigam Manisha	Data Analysis with Excel	BPB
Jagdish N Sheth , Parvatiyar Atul , G Shainesh	Customer Relationship Management: Emerging Concepts, Tools and Applications	McGraw Hill Education
Upendra Rana	Step By Step Guide to SEO	Prabhat Prakashan
Taprial Varinder	Search Engine Optimisation	Pustak Mahal

SUBJECT NAME: Critical Thinking

SUBJECT CODE: BCA24-VAC-282A

CREDIT: 3

CONTACT HOURS : 6P

Sl. No.	Course Objective	
1	To understand key concept of critical thinking	
2	To Clarify the difference in cognition, reasoning and logics. Improve their decision making based on facts, assumptions, arguments etc.	
3	Able to see a problem with a logical approach to find a quick solution.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Explain the meaning of critical thinking and its components.	U1
CO 2	To know the importance of critical thinking in every day's life	U1
CO 3	To know the different kinds of arguments, its validity and evaluation	U2
CO 4	To understand the logical fallacies during arguments	U2
CO 5	Influence of biases during decision making	U3
CO 6	To learn the different techniques to analyze problem and find out the solutions	U3

Learning Outcome/Skills:

The candidate will have an exposure to the intricacies of critical thinking, arguments, logical fallacies and the ability to analyse the complex problems. This would further help the candidate develop a logical and rational bent of mind to face the practical texture with confidence.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Project/Report writing	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	**Introduction of Critical Thinking** ● Define Critical thinking ● Components of critical thinking ● Recognize clear thinking, critical thinking & clear writing ● Benefits of critical thinking in everyday life	**8**
Unit-II	**Arguments & Logical Fallacies** ● Constitution of an argument ● Describe Types of Inductive arguments ● Evaluating the validity and reliability of an argument ● Contextual evaluation of arguments ● What are logical fallacies ● Recognizing logical fallacies in arguments ● Spotting and refuting logical fallacies	**10**
Unit-III	**Cognitive Biases & Analyzing complex problems** ● What are cognitive biases? ● How cognitive biases can lead to poor decision-making ● Avoiding common cognitive biases ● Breaking down complex problems ● Analyzing complex problems using critical thinking techniques ● Using creative problem-solving skills to arrive at innovative solutions	**12**
	Total	**30**

List of Books

Name of Author	Title of the Book
M. Neil Browne, 2011	Asking the Right Questions: A Guide to Critical Thinking
Rolf Dobelli., 1981	The Art of Thinking Clearly
Anthony Weston 1986	A Rulebook for Arguments
Adam M. Grant, 2021	Think Again: The Power of Knowing What You Don't Know
Tom Chatfield, 2017	Critical Thinking: Your Guide to Effective Argument, Successful Analysis and Independent Study (Kindle Edition)

SUBJECT NAME: NSS

SUBJECT CODE: BCA24-VAC-282B

CREDIT: 3

CONTACT HOURS : 6P

Sl. No.	Course Objective	
1	The course help students to understand rich cultural diversity of India and have pride through a better knowledge of the country	
2	Students should be able to understand the community in which they work and their relationship	
3	Identify the needs and problem of the community and involve them in problem solving	
4	Develop capacity to meet emergencies and natural disasters	
5	Practice national integration and social harmony	
	Course Outcomes	**Mapped module/Unit**
CO 1	Explain the meaning NSS and its importance in society.	**U1**
CO 2	Organizational structure and responsibilities	**U1**
CO 3	Basic activities, method and adaptation done by NSS	**U2**
CO 4	Concept of volunteerism & leadership	**U3**
CO 5	Concept of disaster management	**U3**

Learning Outcome/Skills:

The candidate will have a detailed exposure on the basic ideas, approaches, activities and management of NSS. Moreover, the candidate will be able to understand the role of volunteers and their subsequent needs and importance to manage the crucial hours.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Practical	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Chapter	Name of the topic	Hours
Unit-I	**Introduction & Basics Concept of NSS** History and Philosophy Aims, Objectives of NSS. Emblem Sign, NSS Badge, Clap, Flag NSS Song: Lakshya Geet, Sadbhavna Geet, Rastriya Yuba Geet Organizational Structure, Role and Responsibilities	**8**
Unit-II	**NSS Programme & Activities** Concept of Regular activities Visit and survey -orphanage, old age home & child care Methodology of conduct survey Basics of adaptation of village/slums Calender of NSS activities & maintenance of NSS work dairy Understanding Youth: Definition, Profile of youth, Challenges & opportunities of youth	**10**
Unit-III	**Volunteerism & Disaster Management** Volunteerism: Needs and importance, Shramdan as a part of volunteerism Meaning and types of Leadership, Qualities of good leadership, Importance and role of youth leadership Introduction of disaster management, Classification of disaster Role of youth in disaster management	**12**
	Total	**30**

Recommended Books and Links:

Sl. No.	Books and Links:
1	"Ministry of Youth Affairs and Sports".
2	"Contact Us | National Service Scheme".
3	"National Service Scheme | Ministry of Youth Affairs and Sports | GoI".
4	https://nss.gov.in/sites/default/files/Gujarat_0.pdf[bare URL PDF]
5	https://nss.gov.in/sites/default/files/Madhya%20Pradesh.pdf
6	NSS Manual: 2020

SUBJECT NAME: Mental Heath

SUBJECT CODE: BCA24-VAC-282C

CREDIT: 3

CONTACT HOURS : 6P

Sl. No.	Course Objective	
1	Fundamentals of Mental Health gives students in depth understanding about different mental health problems.	
2	It will help them in the diagnosis, assessment and prevention of mental health related issues. Students will learn about different psychological disorders, their diagnostic criteria, causes and treatments. They will also learn about different assessment techniques.	
3	It will help them to take care of their mental health and also the mental health of other people in the society.	
4	After successful completion of the course student will be able to differentiate among different psychological disorders.	
	Course Outcomes	**Mapped module/Unit**
CO 1	To understand and explain the introduction to mental health models, potential identification, wellness and above all the criteria for normal andabnormal behaviour and their subsequent classification and remedial measures.	U1
CO 2	To understand and analyse the concepts of neurotic psychotic disorders, models of psychopathology and overview analysis of the disorders and their diagnostic procedures.	U2
CO 3	To comprehend the impact of different therapies, counselling to curedifferent disorders and their practical solutions.	U3
CO 4	To learn and assess the different techniques that will help to make a correct judgement of different mental health disorders and the ways of treatment and releaf.	U4

Learning Outcome/Skills:

The candidate will gain intense drive to gather a substantial knowledge on the health of mind, different models of psychopathology, roles, assessment and an overview to tackle any kind of related situation in a hassle-free manner.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Practical	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	Introduction to Mental Health - What is Mental Health • What is Mental Illness • Wellness Cycle • Models of Mental Health • Criteria of Normality and Abnormality	**5**
Unit-II	Introduction to Psychopathology - Models of Psychopathology • Concept of Neurosis and Psychosis • DSM & ICD- Classification of Disorders • Some Major psychological disorder: Anxiety related disorder, Mood Disorder, Personality disorder, Stress relateddisorder, Schizophrenia, Childhood developmental disorder, Eating disorder, Geriatricdisorders.	**8**
Unit-III	Psychotherapy - Introduction to psychotherapy. • Different models of psychotherapy: Psychoanalysis, Behaviour Therapy, Cognitive Behaviour Therapy, Rational Emotive Behaviour Therapy, Client Centred Therapy, Gestalt Therapy, Mindfulness based psychotherapy etc. • Introduction to Counselling • Different counselling techniques	**7**
Unit-IV	Psychological Assessment - Personality assessment • IQ assessment • Assessment of some psychological disorder: Anxiety, Mood, Stress • Case History Taking • Mental Status Examination	**10**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
Sadock, B. J, & Sadock V. A Kaplan& Sadock's	Synopsis of Psychiatry: BehavioralSciences/Clinical Psychiatry	Lippincott Williams and Wilkinsand Wolter Kluwer Health, Philadelphia Indian Reprint
Hooley, Butcher, Nock	Abnormal Psychology	Pearson Publication
American Psychiatric Association	Diagnostic & Statistical Manual of MentalDisorders, 5th ed	
	The Icd-10 Classification of Mental & Behavioural Disorders: Clinical Descriptionsand Diagnostic Guidelines	
Woolfe, R., Strawbridge, S et all	Handbook of Counselling	
Sharf R. S	Theories of Psychotherapy & CounsellingConcepts & Cases	
Palmer, S	Introduction to Counselling & Psychotherapy	
Brems, C (2001)	Basic Skills in Psychotherapy & Counselling	
Rao, S	Counseling and Guidance	McGraw Hill Education.
Morrison, J	The Mental Health Clinician's Workbook:Locking in your professional skills	Guildford Press

SUBJECT NAME: Environmental Studies

SUBJECT CODE: BCA24-VAC-282D

CREDIT: 3

CONTACT HOURS : 6P

Sl. No.	**Course Objective**	
1	The course is designed to provide a working knowledge of environment, ecology and physical sciences for problem solving.	
2	The learner will be able to remember, understand and apply the taught concepts and methods involving social and environmental processes for betterment of environmental health and safety.	
	Course Outcomes	**Mapped module/Unit**
CO 1	Be able to remember the basic concepts related to environment & ecology	U1, U2
CO 2	Be able to remember & understand the scientific problem related to air, water, noise & land pollution	U3
CO 3	Be able to understand environmental Protection, different renewable energy sources and environmental movements.	U4

Learning Outcome/Skills:

The candidate will be able to acquire a comprehensive knowledge on the fundamental domains of environment, ecosystem, pollution and the ways and means developed to protect the environment for our future generation. This would also create a sense of responsibility and sharp awareness on the role and importance of environment in our life.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Field Survey/Project	25 Marks
Assignments	25 Marks
Theory Exam	25 Marks
PowerPoint Presentation	25 Marks

Contents		
Chapter	**Name of the topic**	**Hours**
Unit-I	**Fundamentals of Environment:** Introduction, Multidisciplinary nature, Scope and importance; the need for environmental education. Concept of sustainability and sustainable development	**4**
Unit-II	**Ecosystems** Ecosystems: Definition, Structure: food chains, food webs and function of ecosystem: Energy flow, nutrient cycle and ecological succession. Ecological Interactions, Biodiversity and Conservation – Levels, India as a mega-biodiversity nation, Threats to biodiversity, Ecosystem and biodiversity services.	**8**
Unit-III	**Environmental Pollution** Environmental Pollution - Types: - Air pollution, Water pollution, Land pollution, Noise pollution; pollutants, Effects of pollution, Control and Remedial measures.	**10**
Unit-IV	**Environmental Protection** Environmental Protection- Report of the Club of Rome: Sustainable Development, Different Renewable Energy Sources- Wind Power, Water Power, Bio Fuel/Solid Bio Mass, Geothermal Energy, Nuclear Power, Environmental Movements- Chipko movement; Narmada Bachao movement; Tehri Dam conflict.	**8**
	Total	**30**

List of Books

Name of Author	Title of the Book	Name of the Publisher
G.N. Pandey	Environmental Management	Vikas Publishing House Pvt. Ltd.
Cunningham	Environmental Science	TMH.
R. Rajagopalan	Environmental Studies	Oxford
R. Joshi & MunishKapila	Environment Management	Kalyani Publishers.
C.S. Rao	Environmental Pollution Control Engineering	New Age International Publication.

Curriculum

for

Bachelor of Computer Applications
(BCA)

Regulation – 24

(Under Autonomy)

GURU NANAK INSTITUTE OF TECHNOLOGY

157/F, Nilgunj Road, Sodepur, Kolkata-114

Affiliated to -

Maulana Abul Kalam Azad University of Technology

(Formerly known as WBUT)

Program Structure							
SEMESTER	**THEORY**		**PRACTICAL**		**SESSIONAL**		**Semester wise Credits [A+B+C]**
	Courses	**Credits [A]**	**Courses**	**Credits [B]**	**Courses**	**Credits [C]**	
I	5	13	2	4	2	5	22
II	5	13	2	4	2	5	22
III	5	15	2	4	1	2	21
IV	6	17	1	2	0	0	19
V	4	12	2	4	1	4	20
VI	5	16	2	4	0	0	20
VII	5	15	1	2	1	3	20
VIII	2	8	2	4	1	8	20
TOTAL CREDIT							**164**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-I								
SL. No.	**Course Type**	**Course Code**	**Course Name**	**Contact Hours / Week**				**Credit**
				L	**T**	**P**	**TOTAL**	
THEORY								
1	Core Courses (CC)	BCA24-CC-101	Digital Electronics	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-102	Programming for Problem Solving through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-103	Principles of Management	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-104	English & Professional Communication	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets A or D	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-191	Digital Electronics Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-192	Programming for Problem Solving Lab	0	0	4	4	2

SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-181	Life Skills & Personality Development	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-182A	Yoga	0	0	6	6	3
	Value Added Courses (VAC)	BCA24-VAC-182B	Health & Wellness	0	0	6		
	Value Added Courses (VAC)	BCA24-VAC-182C	Sports	0	0	6		
Total Credit								**22**
Total Contact Hours								**29**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-II

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-201	Computer Architecture	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-202	Basics of Web Design Using Html, CSS, Java Script	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-203	Organization Behaviour	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-204	Modern Indian Languages and Literature	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets B or E	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-291	Computer Architecture Lab	0	0	4	4	2

7	Core Courses (CC)	BCA24-CC-292	Basics of Web Design Using Html, CSS, Java Script Lab	0	0	4	4	2
SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-281	IT Skills	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-282A	Critical Thinking	0	0	4	6	3
	Value Added Courses (VAC)	BCA24-VAC-282B	NSS	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282C	Mental Health	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282D	Environmental Studies	0	0	4		
Total Credit								**22**
Total Contact Hours								**29**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-III

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-301	Python Programming	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-302	Data Structure through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-303	Principles of Marketing	2	1	0	3	3
4	Ability Enhancement Courses (AEC)	BCA24-AEC-304	The Constitution, Human Rights and Law	2	1	0	3	3
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets C or F	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-391	Python Programming Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-392	Data Structure Lab	0	0	4	4	2

SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-381	Understanding Basics of Cyber Security	0	0	4	4	2
Total Credit								**21**
Total Contact Hours								**27**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-IV

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-401	Data Base Management System	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-402	Operating System	2	1	0	3	3
3	Core Courses (CC)	BCA24-CC-403	Software Engineering	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-404	Human resource Management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-405	E-Commerce	2	1	0	3	3
6	Ability Enhancement Courses (AEC)	BCA24-AEC-406	Society Culture and Human Behavior	2	0	0	2	2
PRACTICAL								
7	Core Courses (CC)	BCA24-CC-491	DBMS Lab	0	0	4	4	2

		Total Credit	**19**
Total Contact Hours			**21**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-V

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-501	PHP WITH MYSQL	3	1	0	4	4
2	Core Courses (CC)	BCA24-CC-502	Object Oriented Programming with Java	3	1	0	4	4
3	Discipline Specific Elective (DSE)	BCA24-DSE-503	Entrepreneurship	2	0	0	2	2
4	Discipline Specific Elective (DSE)	BCA24-DSE-504	Financial management	2	0	0	2	2
PRACTICAL								
5	Core Courses (CC)	BCA24-CC-591	PHP WITH MYSQL LAB	0	0	4	4	2

6	Core Courses (CC)	BCA24-CC-592	Object Oriented Programming with Java Lab	0	0	4	4	2
SESSIONAL								
7	Internship (INT)	BCA24-INT-581	Industrial Internship			4	4	4
		Total Credit						**20**
Total Contact Hours								**24**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VI								
SL. No.	**Course Type**	**Course Code**	**Course Name**	**Contact Hours / Week**				**Credit**
				L	**T**	**P**	**TOTAL**	
THEORY								
1	Core Courses (CC)	BCA24-CC-601	Advance Java With Web Application	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-602	Unix and Shell Programming	2	1	0	3	3

3	Skill Enhancement Courses (SEC)	BCA24-SEC-603	Networking	3	1	0	4	4
4	Discipline Specific Elective (DSE)	BCA24-DSE-604	Customer relationship management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-605	Career planning and management	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-691	Advance Java With Web Application Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-692	Unix and Shell Programming Lab	0	0	4	4	2
Total Credit								**20**
Total Contact Hours								**24**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VII

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-701A	Data Mining & Data Warehousing	2	1	0	3	3
	Core Courses (CC)	BCA24-CC-701B	Machine Learning	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701C	Pattern Recognition	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701D	Algorithm Analysis	2	1	0	3	
2	Core Courses (CC)	BCA24-CC-702	Cyber Security	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-SEC-703	Research Methodology	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-704	Consumer Behavior	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-705	Strategic management	2	1	0	3	3

PRACTICAL								
6	Core Courses (CC)	BCA24-CC-791A	Data Mining & Data Warehousing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-791B	Machine Learning Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791C	Pattern Recognition Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791D	Algorithm Analysis Lab	0	0	4	4	
SESSIONAL								
7	Research Project (RP)	BCA24-RP-781	Project -1	0	0	6	6	3
Total Credit								**20**
Total Contact Hours								**25**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VIII

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-801A	Cloud Computing	3	1	0	4	4
	Core Courses (CC)	BCA24-CC-801B	Blockchain Technology	3	1	0	4	4
	Core Courses (CC)	BCA24-CC-801C	Artificial Intelligence	3	1	0	4	4
2	Core Courses (CC)	BCA24-CC-802	Statistical Analysis with R Programming	3	1	0	4	4
PRACTICAL								
3	Core Courses (CC)	BCA24-CC-891A	Cloud Computing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-891B	Blockchain Technology Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-891C	Artificial Intelligence Lab	0	0	4	4	2
4	Core Courses (CC)	BCA24-CC-892	Statistical Analysis with R Programming Lab	0	0	4	4	2

SESSIONAL								
5	Skill Enhancement Courses (SEC)	BCA24-SEC-881	Research Project – 2	0	0	16	16	8
Total Credit								**20**
Total Contact Hours								**32**

SEMESTER – III

SUBJECT NAME: Python Programming
SUBJECT CODE: BCA24-CC-301
CREDIT: 3
CONTACT HOURS: 36

COURSE OBJECTIVE:

1. To acquire programming skills in core Python.
2. To understand why Python is a useful scripting language for developers.
3. To learn how to design and program Python applications.
4. To learn how to use lists, tuples, and dictionaries in Python programs.
5. To learn how to identify Python object types.

COURSE OUTCOME:

After successful completion of this course, students will be able to:

CO1: Learn, understand and comprehend the concept of programming, the control statements, iteration
CO2: Understand and applications of string and functions
CO3: Learning the Python Data Structures - List, Tuple, Dictionary etc.
CO4: Understanding file handling mechanisms in Python.
CO5: Handling errors and exception handling mechanisms in Python.
CO6: Understand the principles of object-oriented programming and be able to create classes, objects, and inheritance hierarchies to model real-world entities and solve problems, using modules and packages like Numpy.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Fundamental concepts (6L)** History and Overview, Python 3 versus Python, Execution of Python Program, Viewing the byte code, Python Virtual machine, Compare between C and Python, Compare between Java and Python, If statement, else-if statement, multiple statements within if, multiple if statement. While Loop, For Loop, Nesting Loops, Controlling Loops using Break and Continue, Else Statement, Range Statement and Pass Statement in Loop.	6
M2	**String and Function (6L)**	6

	Introduction, Traversing the string, String concatenation and replication, Membership operator, comparison operator, determine unicode value of single character, slicing, built in functions (len(), capitalize(), count(), find(), index(),isalpha(), isalnum(), isdigit(), isspace(), islower(),lower(), upper(), strip(0, lstrip(), rstrip(), join(), title(), split(), partition(), endswith(), startswith(), replace(), Define a function, Calling a function, Return results from function, Return multiple values from function, Formal and Actual arguments, Positional arguments, Default arguments, Keyword arguments, Variable length arguments Local and Global variable, Recursive function, using Lambdas with filter(), lambdas with map(), Built in function, user defined function, Recursive function.	
M3	**Lists, Tuples & Dictionary(8L)** Creation of list,empty list, nested list, use of list(), Accessing list, length of list, indexing and slicing of list, Traverse the list, Compare the list, Joining the list, Replication of list, Making the true copy of list, index(0, append() and extend(), insert(), pop( ), popitem(), del and clear(), count(), reverse(), sort and sorted, two dimensional list, Creation of tuple (empty tuple, single element, create tuple from existing sequence, nested tuple), Accessing tuples, Traverse tuple, join , len( ), max(), min(), Creating dictionary empty dictionary, add key:value pair in dictionary, use of dict(), specify value pair separately in sequence, Add elements to dictionary, Check existence of a key in dictionary, get(), items(), keys(), values(), len(), fromkeys(), extend update dictionary with new value, making shallow copy of dictionary, delete elements from dictionary(clera(), pop(), poitem(), del) , max(), min(), sum()	10
M4	**File Management (4L)** Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files and directories	4
M5	**Errors and Exception Handling(2L)** Dealing with syntax errors, Exceptions, Handling exceptions with try/except, Cleaning up with finally	3

M6	**Classes, Objects and modules** Create a Class, Create Object, Init() Function, Methods, Self Parameter, Modification and Deletion of Object Parameter, Deletion of Object, Pass Statement, Inheritance and Polymorphism, Scope, Module, Built-In Math Function, Math Module, Module date time and Date Objects, RegEx Module and RegEx Functions, Exception Handling, Importing a module, Creating module, Function aliases, packages, NumPy Arrays, Array Creation using Built-in Function, Random Sampling in NumPy, Array Attributes and Methods, Array Manipulation, Indexing and Iteration. Pandas: reading files, exploratory data analysis, data preparation and processing, , Matplotlib : Scatterplot, Line plot, Bar plot, Histogram, Box plot, Pair plot	7

SUGGESTED READING:

1. Python Programming: A Modular Approach" by Sheetal Taneja and Naveen Kumar (Publisher: Oxford University Press India)
2. Python for Beginners: A Step-by-Step Guide to Learn Python from Zero with Hands-on Exercises" by Ajit Kumar (Publisher: BPB Publications)
3. “Python:APracticalIntroductiontoProgramming"bySubinSiby(Publisher:BPB Publications)
4. “Python Programming: Problems and Solutions" by S. S. Srivastava and M.H. Khan (Publisher: Khanna Publishers)
5. “Python Programming: A Beginner's Guide to Learn Python in7 Days" by Darshan Patel (Publisher: BPB Publications)

SUBJECT NAME: Data Structure through C
SUBJECT CODE: BCA24-CC-302
Credit: 3
CONTACT HOURS : 36

COURSE OBJECTIVE:

1. Provide students with a solid foundation in fundamental data structures and algorithms.
2. Develop proficiency in implementing data structures and algorithms using C.
3. Empower students with the knowledge, skills, and problem-solving abilities necessary to tackle complex computational problems.
4. Enable students to excel in their academic and professional pursuits in the field of computer application.

COURSE OUTCOME

CO1	Students will comprehend the fundamental concepts of data structures, algorithms, arrays, linked lists, stacks, queues, and how they are implemented in the C programming language.
CO2	Gain proficiency in implementing various data structures using C programming language, including dynamic memory allocation, pointers, and structures.
CO3	Develop the ability to analyse problems and choose appropriate solving mechanisms - iteration, recursion etc.
CO4	Implementation of non-linear data structures like graphs, trees and their applications in real life.
CO5	Different mechanisms of searching and sorting, implementation of the algorithms and their applications.
CO6	Understand and apply various hashing techniques to efficiently store and retrieve data

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	Hours
M1	Concepts of data structures: Data and data structure, Abstract Data Type,	6

	Algorithms and programs, basic idea of pseudo-code. Algorithm efficiency and analysis, time and space analysis of algorithms – order notations. Different representations – row major, column major. Arrays: 1D, 2D and Multi-Dimensional Arrays, Sparse Matrices. Polynomial representation, Implementation of Stack and Queue, Example of Infix, Postfix, and prefix,Circular Queue, De-queue, Priority Queues	
M2	Linked Lists : Singly, Doubly and Circular Lists, Normal and Circular representation of Self Organizing Lists, Skip Lists, Polynomial representation, Implementation of Stack and Queue, Circular List, Stack as Circular list, Queue as Circular list	8
M3	Recursion: Developing Recursive Definition of Simple Problems and their implementation, Advantages and Limitations of Recursion,Internal Stack representation, Factorial function, Fibonacci Sequence, Binary Search, The tower of Hanoi Problem	5
M4	Trees : Introduction to Tree as a data structure, Binary Trees (Insertion, Deletion, Recursive and Iterative Traversals of Binary Search Trees), Threaded Binary Trees (Insertion, Deletion, Traversals), Height-Balanced Trees (Various operations on AVL Trees).	6
M5	Searching and Sorting: Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Merge Sort, Quick sort, Shell Sort, Comparison of Sorting Techniques	6
M6	Hashing : Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collision by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect Hashing	5

SUGGESTED READING:

1. Expert Data Structures with C by R. B. Patel, Khanna Publishing House
2. Data Structures Through C in Depth by S. K. Srivastava and Deepali Srivastava - BPB Publications 3. Data Structures Through C by Yashavant Kanetkar - BPB Publications
4. Data Structures: A Pseudocode Approach with C by Richard F. Gilberg and Behrouz A. Forouzan (Adapted by Dinesh P. Mehta) - Cengage Learning India
5. Data Structures and Algorithm Analysis in C by Mark Allen Weiss (Adapted by Dinesh Mehta) - Pearson Education India
6. Data Structures Using C and C++ by Tanenbaum - Pearson Education India
7. Data Structures and Algorithms Made Easy by M. S. Kutti Swamy - Pearson Educationdia

SUBJECT NAME: PRINCIPLES OF MARKETING

SUBJECT CODE: BCA24-DSE-303

Credit: 3

CONTACT HOURS : 36

COURSE OBJECTIVE:

1. Understand the core concepts, principles, and functions of marketing.
2. Analyze the role of marketing in the overall business environment.
3. Explore consumer behavior and market segmentation strategies.
4. Develop knowledge of the marketing mix (product, price, place, promotion) and its applications.
5. Evaluate marketing strategies and decision-making processes.
6. Apply marketing concepts to real-world business scenarios and case studies.
7. Foster critical thinking and communication skills in marketing planning and implementation.

Course Outcome:

After successful completion of this course, students will be able to:

CO1: Understand the marketing concepts and its evolution

CO2: Know the consumer behaviour and their decision-making process.

CO3: Make decisions on product, price, promotion mix and distribution.

CO4: Learn to make Sales Promotion, related Programs and Advertisement

CO5: Learning Marketing of Services, different medium of marketing, E marketing - Strategies, significance and impact of E marketing in modern days

MODULE NO.	**COURSE CONTENT**	**Hours**
1	Introduction to Marketing (8**L)** Marketing- An Introduction, Concept, core concepts of Marketing- Need, Want, Demand, Value, Satisfaction, exchange, transaction & relationship. Modern Marketing concept:Modern Marketing concept, holistic marketing & green marketing. Marketing in the 21st Century- Challenges & opportunities. Mix, Marketing-Process and Functions, Marketing Environment, Marketing Information System and Marketing Research	6
2	Consumer Behaviour and Product Life Cycle**(8L)** Consumer Behaviour Market Segmentation Positioning Product- An Introduction and Classification Product Life Cycle and Competitive Strategies	8

3	Product Mix Strategies and Price Strategies **(8L)** Product Line and Product Mix Strategies Branding, Packaging and Labelling Price-Planning, Policies and Strategies Distribution Channel Planning	8
4	Sales Promotion Programme and Advertisement **(8L)** Sales Promotion Programme Advertising Personal Selling Decision and Publicity International Marketing	8
5	Marketing of Services and E marketing - **(8L)** Meaning, Characteristics of marketing services, problems in services Marketing, Outsourcing of I.T. services. E- Marketing:Concept & techniques, significance of e-Marketing in 21st Century	6

Suggested Readings:

1. 1.Kotler, Armstrong, Agnihotri and Haque, (2010), Principles of Marketing- A South Asian Perspective, 13th edition, Pearson Education.
2. 2.Ramaswamy and Namkumar, S., (2009), Marketing Management Global Perspective: Indian Context, McMillan, Delhi.
3. 3. Saxena, Rajan, (2008), Marketing Management, 3rd edition, McGraw Hill Education. 4.Kumar, Arun and Meenakshi, N., (2009), Marketing Management, Vikas Publishing House.

SUBJECT NAME: **The Constitution, Human Rights and Law**

SUBJECT CODE: BCA24-AEC-304

Credit: 3

CONTACT HOURS : 36

COURSE OBJECTIVE:

1. To realise the significance of the constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.
2. To identify the importance of fundamental rights as well as fundamental duties.
3. To understand the functioning of Union, State and Local Governments in the Indian federal system.
4. To learn procedure and effects of emergency, composition and activities of election commission and amendment procedure

Course Outcome:

After successful completion of this course, students will be able to:

CO1: Describe historical background of the constitution making and its importance for building a democratic India.

CO2: Explain the functioning of three wings of the government i.e., executive, legislative and judiciary.

CO3: Explain the value of the fundamental rights and duties for becoming a good citizen of India.

CO4: Analyse human rights issues and challenges, including discrimination, inequality, and violations of human rights

CO5: Develop skills in advocating for human rights and engaging in activism to promote and protect human rights

MODULE NO.	COURSE CONTENT	Hours
1	**Introduction to Indian Constitution:(8L)** Constitution meaning of the term - The making of the Indian Constitution - Sources and constitutional history – Philosophy of Constituent Assembly - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.	8
2	**The Union: Executive, Legislative and Judiciary (6L)**	8

	Union Executive- President, Vice-president, Prime Minister, Council of Ministers. Union Legislature Parliament and Parliamentary proceedings. Union Judiciary-Supreme Court of India – composition and powers and functions	
3	**State and Local Governments (4L)** State Executive- Governor, Chief Minister, Council of Ministers. State Legislature-State Legislative Assembly and State Legislative Council. State Judiciary-High court. Local Government-Panchayat raj system	6
4	**Emergency Provisions and Election Commission (4L)** Emergency: Proclamation of Emergency, types of emergencies - Election Commission: Role of Chief Election Commissioner - State Election Commission - Functions of Commissions for the welfare of SC/ST/OBC and women	6
5	**HUMAN RIGHTS (8L)** Foundational Aspects: Meaning, Characteristics; Classification; Generations of Human Rights. NHRC and its working, other organizations working for the cause, Relationship between Rights and fundamental freedom, addressing rights of women, children, disabled and tribals Comparing diverse issues of tribals, refugees and prisoners. Human Challenges faced by legal academicians, activists and NGOs in effective implementation of Human Rights and laws. Various perspectives and role of Media, Laws safeguarding Human Rights and its implementation.	8

Suggested Readings:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India

Pvt.Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. Sastry, S. N. Introduction to Human Rights and Duties. Pune: University of Pune Press, 2011.
4. Deol, Satnam Singh. Human Rights in India-Theory and Practice. New Delhi: Serials Publications, 2011

Practical:

SUBJECT NAME: Python Programming Lab

SUBJECT CODE: BCA24-CC-391

Credit: 2

Contact Hours : 40

Course Objective:

The students will learn

1. Interpret the use of procedural statements like assignments, conditional statements, loops and function calls.
2. Infer the supported data structures like lists, dictionaries and tuples in Python.
3. Illustrate the application of matrices and regular expressions in building the Python programs.
4. Discover the use of external modules in creating excel files and navigating the file systems.
5. Describe the need for Object-oriented programming concepts in Python

MODULE NUMBER	Name of the topic
M1	**Python Basics:** Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program
M2	**Python Data Types & Input/output:** Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command.
M3	**Operators and Expressions:** Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.
M4	**Control Structures:** Decision making statements, Python loops, Python control statements.
M5	**Python Native Data Types:** Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings(in detail with their methods and operations).
M6	**Python Functions:** Built-in Functions, User defined functions, Anonymous functions, Pass by value, Pass by Reference, Recursion
M7	**Exception Handling:** Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.

M8	**File Management in Python:** Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, Renaming & deleting files in Python, directories in Python.
M9	**Python Numpy:** Numpy data types, Operations on Numpy Array(Indexing, slicing, shape/reshape, iteration, join, split, search, sort, filter)

List of Practical:

1. Fizz Buzz: Write a program that prints the numbers from 1 to 100. But for multiples of three, print "Fizz" instead of the number, and for the multiples of five, print "Buzz". For numbers that are multiples of both three and five, print "Fizz Buzz".

2. Palindrome Checker: Write a function to determine if a given string is a palindrome (reads the same forwards and backwards). Ignore spaces, punctuation, and capitalization.

3. Factorial Calculation: Write a function to calculate the factorial of a given number recursively.

4. Prime Number Generator: Write a function to generate a list of prime numbers up to a given number using the Sieve of Eratosthenes algorithm.

5. Word Count: Write a program that takes a string as input and counts the frequency of each word in the string. Ignore case and punctuation.

6. Reverse a Linked List: Implement a function to reverse a singly linked list in-place.

7. Binary Search: Implement the binary search algorithm to find the index of a given element in a sorted list.

8. Anagram Checker: Write a function to determine if two strings are anagrams of each other (contain the same characters in a different order).

9. Matrix Transpose: Write a function to transpose a given matrix (convert rows to columns and vice versa).

10. Tower of Hanoi: Implement the Tower of Hanoi puzzle using recursion.

List:

1. Sum of List Elements: Write a program that calculates the sum of all elements in a list of numbers.
2. Maximum and Minimum Element in List: Write a program to find the maximum and

minimum elements in a list.
3. List Reversal: Write a program to reverse a given list.
4. List Sorting: Write a program to sort a list of numbers in ascending or descending order.
5. List Filtering: Write a program to filter out even or odd numbers from a list.
6. List Concatenation: Write a program to concatenate two lists into one.
7. List Intersection: Write a program to find the intersection of two lists (i.e., elements that appear in both lists).
8. List Union: Write a program to find the union of two lists (i.e., all unique elements from both lists).
9. List Flattening: Write a program to flatten a nested list (i.e., convert a list of lists into a single list).
10. List Element Removal: Write a program to remove all occurrences of a specific element from a list.
11. List Rotation: Write a program to rotate a list by a given number of positions.
12. List Comprehensions: Write a program to generate a new list based on a given list using list comprehensions (e.g., square each element of a list).

Dictionary:

Word Frequency Counter:
Write a program that takes a string as input and counts the frequency of each word using a dictionary. Ignore case and punctuation.

Merge Two Dictionaries:
Write a function to merge two dictionaries into one, where the values of duplicate keys are added together.

Dictionary Key Sort:
Write a function to sort the keys of a dictionary in alphabetical order and return a new dictionary with the sorted keys.

Nested Dictionary Access:
Write a function to access a value in a nested dictionary given a list of keys. For example, given the dictionary {'a': {'b': {'c': 1}}} and the keys ['a', 'b', 'c'], the function should return 1.

Dictionary Inversion:
Write a function to invert a dictionary, where the keys become values and the values become keys. Assume that the values are unique.

Dictionary Intersection:
Write a function to find the intersection of two dictionaries (i.e., keys that appear in both dictionaries) and return a new dictionary with the common keys and their values.

Practical:

SUBJECT NAME: Data Structure Lab

SUBJECT CODE: BCA24-CC-392

Credit : 2

Contact Hours : 40

Course Objective:

The students will learn

1. Develop a strong understanding of fundamental data structures such as arrays, stacks, queues, linked lists, trees, and hash tables.
2. Gain proficiency in implementing various data structure operations including insertion, deletion, traversal, and searching using the C programming language.
3. Apply sorting and searching algorithms effectively to solve computational problems.
4. Analyze and implement advanced data structures such as circular queues, threaded binary trees, AVL trees, and expression trees.
5. Explore the use of linked lists in applications like polynomial operations and sparse matrix manipulations.
6. Strengthen problem-solving and logical thinking skills through the development of real-world applications using dynamic and static data structures.

MODULE NUMBER	**Name of the topic**
M1	**Array Operations and Manipulations:** -Implementation of basic array operations (insertion, deletion, searching, updating), -Sorting arrays using Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, and Quick Sort , -Searching techniques: Linear Search, Binary Search, Interpolation Search, -Two-dimensional arrays and their applications (matrix operations)
M2	**Stacks and Queues:** - Implementation of stacks using arrays and linked lists - Push, Pop, and Peek operations in stacks - Queue operations: Enqueue and Dequeue - Variations: Double-ended queues (Deque) and Priority Queues
M3	**Circular Queue** - Implementation of Circular Queues using arrays and linked lists - Overflow and underflow conditions - Applications of Circular Queues in real-world scenarios
M4	**Advanced Stack and Queue Problems**

	- Expression evaluation using Stacks (Infix to Postfix conversion, Postfix evaluation) - Multiple Stack and Queue operations (Merging, Splitting, and Multi-Queue Management)
M5	**Linked List Implementation** - Singly Linked List: Insertion, Deletion, and Reversal - Doubly Linked List: Insertion, Deletion, and Reversal - Circular Linked List: Implementation and traversal
M6	**Stacks and Queues Using Linked Lists** - Implementation of Stack using Linked List (Dynamic Stacks) - Implementation of Queue using Linked List (Dynamic Queues) - Applications of Linked List-based Stacks and Queues
M7	**Polynomial Operations** - Polynomial Representation using Linked Lists - Polynomial Addition and Multiplication
M8	**Sparse Matrices** - Representation of Sparse Matrices using Linked Lists and Arrays - Addition and Multiplication of Sparse Matrices
M9	**Tree Structures and Their Applications** - Recursive and Non-Recursive Tree Traversals (Preorder, Inorder, Postorder) - Threaded Binary Tree and its Traversals - AVL Tree Implementation (Insertion, Deletion, Rotations) - Applications of Trees in Expression Trees, Huffman Coding, and Decision Trees
M10	**Sorting, Searching, and Hashing Techniques** - Application of Sorting and Searching Algorithms - Hash Table Implementation (Chaining and Open Addressing) - Searching, Inserting, and Deleting in Hash Tables - Applications of Hashing in Database Indexing and Caching

SUBJECT NAME: UNDERSTANDING BASICS OF CYBER

SECURITY SUBJECT CODE: BCA24-SEC-381

CREDIT: 2

CONTACT HOURS: 40

COURSE OBJECTIVE:

- Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization
- Practice with an expertise in academics to design and implement security solutions.
- Understand key terms and concepts in Cryptography, Governance and Compliance.
- Develop cyber security strategies and policies
- Understand principles of web security and to guarantee a secure network by monitoring and analyzing the nature of attacks.

COURSE OUTCOME	
CO1	Understand basic concepts of cyberspace, computers, and cyber security.
CO2	Know different types of cybercrimes and related laws in India.
CO3	Learn about social media and how to use it safely.
CO4	Understand e-commerce and its security practices.
CO5	Know how digital payments work and how to avoid fraud.
CO6	Learn how to keep digital devices safe and secure.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC
M1	**Introduction:** Defining Cyberspace and Overview of Computer and Web-technology, Fundamentals of data communication and networking, Concept of cyber security, Information security goals (Confidentiality, Integrity and availability), Issues and challenges of cyber security
M2	**Cybercrime and Cyber law:** Cyber laws, What offences are covered under these laws (Hacking, Data theft, Identity theft (including Password Theft), Email spoofing, Sending offensive messages, Voyeurism, Cyber terrorism) Punishment for cybercrime in India, Reporting of cybercrimes: Organisations dealing with Cybercrime and Cyber security in India.
M3	**Social Media Overview and Security:** Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hash tag, Viral content, Social media marketing, Best practices for the use of Social media.
M4	**E - Commerce:** Definition of E- Commerce, Main components of E-Commerce, Elements of E- Commerce security, E-Commerce threats, E-Commerce security best practices

M5	**Digital Payments:** Introduction to digital payments, Components of digital payment and stakeholders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e- Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions. Relevant provisions of Payment Settlement Act 2007.
M6	**Digital Devices Security:** Password policy, Security patch management, Data backup, Downloading and management of third-party software, Device security policy, Cyber Security best practices

SUGGESTED READING:

1. " Cyber Crime and Its Prevention in Easy Steps " by Debtoru Chatterjee - Publisher: Khanna Publishing House

2. " Fundamentals of Cyber Security " by Mayank Bhushan - Publisher: BPB Publications

3. " Information Security & Cyber Laws " by Gupta & Gupta - Publisher: Khanna Publishing House

4. " Introduction to Security of Cyber-Physical Systems " by Jeeva Jose & Vijo Mathew - Publisher: Khanna Publishing House

5. " Data communication and Networking " by Behrouz A. Forouzan - Publisher: McGraw Hill Education

6. " E-Commerce " by M.M. Oka - Publisher: Everest Publishing House

Syllabus of BCA

(Effective from 2024-25 Academic Sessions)

SEMESTER – IV

SUBJECT NAME: DATABASE MANAGEMENT SYSTEM

SUBJECT CODE: BCA24-CC-401

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

- Provide students with a thorough understanding of fundamental principles and practical applications of Database Management Systems (DBMS).
- Explore essential concepts of database architecture, data manipulation, and database administration.
- Develop the ability to design efficient and resilient databases using entity-relationship (ER) modelling.
- Apply normalization techniques to ensure data integrity and enhance database performance.
- Acquire hands-on skills in the implementation and management of relational databases.
- Demonstrate proficiency in using databases to support informed decision-making and achieve organizational objectives.

COURSE OUTCOME	
CO1	Employ fundamental principles of Database Systems in Database architecture.
CO2	Utilize SQL queries to engage with the Database.
CO3	Construct a Database utilizing Entity-Relationship Modelling.
CO4	Implement normalization in database design to eliminate anomalies.
CO5	Examine database transactions and regulate them by implementing ACID characteristics.
CO6	Apply indexing techniques to enhance the performance of database systems.

DETAILED SYLLABUS:

MODULE NO:	**NAME OF THE TOPIC**	**HOURS**
M1	**Introduction:** Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Data Abstraction, Three Schema architecture of DBMS.	2
M2	**Entity Relationship Model & Relational Algebra:** Entity Set, Simple and composite Attribute, Single valued and multivalued attribute, Relationship sets, Mapping cardinality, keys, Binary vs n-ary relationship, Entity Relationship Diagram: Need for E-R Model, Various steps of database design, Mapping Constraints, E-R diagram, Subclass, Generalization, Specialization, Aggregation,	8

	Strong Entity-Weak Entity. Select operation, Project Operation, set operations (union, intersection, difference), Join operations, Division operation, outer join and outer union, Example queries in Relational Algebra.	
M3	**SQL:** Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All, view and its types. Transaction control commands – Commit, Rollback, Save point, cursors, stored procedures, Triggers.	6
M4	**Relational Database design:** Closure set, Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Codd Normal Form, Normalization using multivalued dependencies, 3NF, 4NF.	6
M5	**Indexing and Hashing:** Ordered indices (Primary Index, Dense and Sparse Indices), Secondary Index, B tree and B+ tree indexing, Hashing Concepts and its implementation.	6
M6	**Transaction Management:** Concept of transaction, ACID property, Concurrency control, Serializability of scheduling, Locking and timestamp-based schedulers, Concurrency Control schemes, Database recovery, Deadlock handling and prevention.	8

SUGGESTED READING:

1. "Database Management Systems" by Raghu Ramakrishnan, Johannes Gehrke - Publisher: McGraw-Hill Education

2. "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, S. Sudarshan - Publisher: McGraw-Hill Education

3. "Fundamentals of Database Systems" by Ramez Elmasri, Shamkant B. Navathe - Publisher: Pearson

4. "Database Management Systems: Designing and Building Business Applications" by Gerald V. Post - Publisher: Wiley

5. "Database Systems: The Complete Book" by Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom - Publisher: Pearson

6. "Database Management Systems" by Ivan Bayross - Publisher: BPB Publications.

SUBJECT NAME: Operating System

SUBJECT CODE: BCA24-CC-402

Credit: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

- Provide a comprehensive understanding of the fundamental principles and architecture of modern operating systems.
- Explore core concepts including process management, memory management, file systems, and I/O management.
- Understand the role of the operating system in managing hardware and software resources effectively.
- Learn techniques for CPU scheduling, process synchronization, and inter-process communication.
- Analyze how operating systems ensure efficient, reliable, and secure system performance.

COURSE OUTCOME

CO1	Understand computer hardware, types of operating systems, virtualization, and OS architecture.
CO2	Learn how processes and threads are managed and scheduled in an operating system.
CO3	Understand memory management techniques like paging, segmentation, and virtual memory.
CO4	Learn file systems, file types, and disk scheduling methods.
CO5	Understand security threats, software vulnerabilities, and protection techniques.
CO6	Learn the basics of distributed operating systems and related concepts like RPC and clock synchronization.

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	Hours

M1	Computer H/w review (Processors, Memory, devices, I/O bus), Operating system Basic concepts, Introduction of Different types of Operating System(Mainframe, server side OS Multiprocessor OS, Embedded OS), Virtualization, Protection and security, Kernel data structures Operating System Architecture -Monolithic System, Layered System, Microkernel, client Server model, System Calls, Linker and Loader, Booting of an Operating System	4
M2	Process Management: Process, Process State Diagram, Process Control Block, Process Scheduling criteria, Process scheduling algorithms, Types of schedulers, Threads, types of thread, Thread Scheduling, Inter Process Communication , Race Condition, Critical region, use of Semaphore, mutex, and monitor, Classical problems on Synchronization Deadlock Characterization, Methods of handling Deadlock, Deadlock prevention and avoidance, deadlock detection and Recovery from deadlock	10
M3	Memory Management: Continuous Memory Allocation, Paging, Swapping, Virtual memory: Paging, Page table Structure, Page Table for large memory, Page replacement Algorithms, page Size, Page Fault Handling, Segmentation	8
M4	File management: File naming, File structures, File Types, Single Level and Hierarchical OS, Shared file, Disk management and Disk scheduling strategies	4
M5	Security and Protection: security Threats and Attackers, Controlling Access to Resources (Protection Domain, access Control List,) Exploiting Software (Buffer overflow attack, Integer Overflow attack, Dangling Pointer, Null Pointer Dereference Attack), Malware (Worm, virus and Trojan)	6
M6	Distributed Operating System: Goal of Distributed OS, Remote Procedure call, Name resolution, Clock Synchronization,	4

SUGGESTED READING:

1. "Operating System Concepts" by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne - Publisher: Wiley
2. "Modern Operating Systems" by Andrew S. Tanenbaum, Herbert Bos - Publisher: Pearson
3. "Operating Systems: Internals and Design Principles" by William Stallings - Publisher: Pearson
4. "Operating System Design and Implementation" by Andrew S. Tanenbaum, Albert S. Woodhull - Publisher: Pearson
5. "Operating Systems: Principles and Practice" by Thomas Anderson, Michael Dahlin - Publisher: Recursive Books
6. "Operating Systems: Three Easy Pieces" by Remzi H. Arpaci-Dusseau, Andrea C. Arpaci-Dusseau - Publisher: Arpaci-Dusseau Books
7. "Modern Operating Systems: Global Edition" by Andrew S. Tanenbaum, Herbert Bos - Publisher: Pearson

SUBJECT NAME: SOFTWARE ENGINEERING

SUBJECT CODE: BCA24-CC-403

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

- Provide a thorough understanding of software engineering principles, methodologies, and best practices.
- Cover key stages of the software development lifecycle: requirements analysis, system design, implementation, testing, deployment, and maintenance.
- Develop the ability to design and build high-quality, scalable, and maintainable software systems.
- Equip students with skills to manage software projects effectively, ensuring alignment with stakeholder expectations.
- Emphasize adherence to industry standards and practices throughout the software development process.

COURSE OUTCOME	
CO1	Understand software engineering concepts and compare different software development life cycle models.
CO2	Learn about software metrics, object-oriented concepts, and design techniques.
CO3	Plan software projects including scope, resources, scheduling, estimation, and risk management.
CO4	Understand software design methods including data, architecture, components, and user interface design.
CO5	Apply software testing techniques and understand quality management processes.
CO6	Learn about software configuration management and its application in web-based projects.

DETAILED SYLLABUS

MODULE NO:	**NAME OF THE TOPIC**	**HOURS**
M1	**Introduction:** Software Engineering Concepts, A Generic View of Software Engineering, Phases in software development, Linear Sequential Model, Prototype model, Evolutionary Model (Incremental and spiral model), Comparison of different life cycle models.	5
M2	**Concept on Different Metrics & Object Oriented Terminologies:** Software Measurement (Size oriented, Function Oriented, Extended Function Point Metrics, Object - Oriented Metrics, Web application project Metric), metric for Software quality (Measuring Quality, Defect Removal efficiency). Integrate metric with software (Establishing a baseline) class, Objects, attributes, Operations, Methods, and Services, Messages, Identifying the Elements of an Object Model (identification of class and objects, Defining Operations),	5

	Object Oriented analysis and Design (use cases , Class-Responsibility-Collaborator Modeling,), Object-Relationship Model	
M3	**Planning**: Identification of Software scope (Feasibility), Resource Identification (Human resource, Reusable Software Resources), Empirical Estimation Models (COCOMO model), Estimation for Object oriented project, Estimation for agile development, Estimation for Web application project, Estimation of human resource requirement, Team structure, Time estimation, Project scheduling (Time - Line Charts, Tracking the Schedule, Scheduling for WebApp Projects) Make / buy decision (Creating a Decision Tree), Project Monitoring Plan (Time sheet, reviews, Cost schedule Milestone graph), Risk management (Identification, Prioritization, Risk Mitigation, Monitoring, and Management)	10
M4	**Design:** data Design, Architectural design / mapping using data Flow (Transform flow and Transactional flow), Designing class Based Components, Component Level design for Web Application, User Interface design Technique and documentation (Reduce the User's Memory Load, make interface consistent), Interface Design steps (User Interface Design Patterns, design issues), Discuss with a case study, Structural Partitioning (Horizontal and vertical Partition), Functional Independence (Coupling and Cohesion)	6
M5	**Software Testing & Quality Management:** Objective, Pimples, Test case Design for conventional software (Unit testing, Integration Testing), path testing, Cyclomatic complexity, Test Strategy for Object Oriented software, Test cases for web application, validation testing, System testing (Recovery testing, Security testing, stress testing, Performance testing) Define quality of software, McCall's Quality Factors, ISO 9126 Quality Factors, Achieve software quality (Software Engineering Methods, project Management Technique), Quality Control, Quality Assurance (elements of quality assurance), SQA goals, tasks, Metrices, Six Sigma for Software Engineering	5
M6	**Software Configuration Management (SCM):** Elements of a Configuration Management System, Baseline, Software Configuration Items, SCM Features, SM processes (Version Control, Change Control, Configuration Audit, Status Reporting), SCM for Web application (WebApp Configuration Objects, Content management, Change management)	5

SUGGESTED READING:

1."Software Engineering: Principles and Practices" by Deepak Jain, S. K. Gupta - Publisher: Laxmi Publications

2. "Software Engineering and Quality Assurance" by Kshirasagar Naik, Priyadarshi Tripathy - Publisher: Oxford University Press

3. "Software Engineering: Theory and Practice" by Shariq Mahmood, A. A. Sastry - Publisher: Oxford University Press

4. "Software Engineering: A Precise Approach" by Pankaj Jalote - Publisher: Wiley India

5. "Software Engineering" by Pankaj Jalote - Publisher: Pearson Education India

6. "Software Engineering: A Lifecycle Approach" by Surajit Ghosh, Anirban Basu - Publisher: Pearson Education India

7. "Fundamentals of Software Engineering" by Rajib Mall - Publisher: Prentice Hall India

8. "Software Engineering: A Practitioner's Approach" by Roger S. Pressman - Publisher: McGraw-Hill Education

9. "Software Engineering" by Ian Sommerville - Publisher: Pearson Education Limited

10. "Introduction to the Team Software Process" by Watts S. Humphrey - Publisher: Addison-Wesley Professional

SUBJECT NAME: HUMAN RESOURCE MANAGEMENT
SUBJECT CODE: BCA24-DSE-404

CREDIT: 3

CONTACT HOURS: 40

COURSE OBJECTIVE:

- Foster comprehension of the core principles of management.
- Cover key operational aspects of management practices.
- Enable students to understand the foundational tenets of effective management.
- Prepare students to apply basic management concepts in real-world organizational settings.

COURSE OUTCOME	
CO1	Understand the basics of Human Resource Management, its evolution, and its importance in organizations.
CO2	Learn the process and importance of Human Resource Planning and Job Analysis.
CO3	Understand recruitment and selection processes, and distinguish between training, development, and education.
CO4	Gain knowledge of Human Resource Development (HRD) and methods for assessing HRD needs.
CO5	Understand performance appraisal techniques and common appraisal methods.
CO6	Learn the basics of compensation management and wage/salary calculation in theory.

DETAILED SYLLABUS:

MODULE NO:	**NAME OF THE TOPIC**	**HOURS**
M1	**Introduction:** , Definition of Human Resource, Definition & Concept of Personnel Management, Comparison between Personnel Management & HR. Nature, Aim and Objectives, Scope & Coverage & Nature of HRM, Importance of Human Resource Management. Historical Perspective & Evolution of Human Resource Management in India. Development of HR Functions, Structure & Function of HR Manager, Role of Line Managers in Managing Human Resources. Difference Between Line Function and Staff Function. Changing Function of Human Resource Management with Examples..	6
M2	**Human Resource Planning**: Meaning, Objectives, Importance of Human Resource Planning, Need for HR Planning, Assessment of Available HR in the Organization, Work Load Analysis, Manning Norms, Demand Analysis of Future Requirement of HR, HR Policy.	6
M3	**Job Analysis:** Concept, Uses, Job Description, Job Specification, Methods of collecting Job Analysis Data, Job Evaluation.	6
M4	**Talent Acquisition and Training:** Recruitment: Definition, Sources of Selection, Process of Selection, Difference Between Recruitment and Selection. Training: Definition, Difference between Training, Development and Education, Different Methods of Training,	6

	Training needs assessment – KIRK-PATRICK, CIPO, CIRO, Training calendar.	
M5	**HRD:** Definition, objective, process of HRD, Assessment of HRD Needs, HRD Methods	6
M6	**Introduction to Performance appraisal:** Purpose, Methods, Appraisal instruments, 360-degree Appraisal, HR Scorecard, Errors in appraisal, Potential Appraisal, Appraisal Interview. Compensation Management – Calculation of wage and salary (only theory)	6

SUGGESTED READING:

1. VSP Rao- Human Resource management - Excel publication
2. Human Resource Management - Gary Dessler-Pearson Education
3. Human resource management - K. Aswathappa -McGraw Hi

SUBJECT NAME: E-COMMERCE

SUBJECT CODE: BCA24-DSE-405

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

- Provide students with a solid understanding of e-commerce principles, technologies, and business strategies.
- Develop skills in designing, developing, and managing effective e-commerce systems.
- Equip students with the knowledge and competencies to navigate the dynamic and competitive e-commerce landscape.
- Prepare students for careers in various e-commerce-related roles across industries.

COURSE OUTCOME	
CO1	Define electronic commerce (e-commerce) and its various forms and applications.
CO2	Analyze different e-commerce business models, technological infrastructure and tools including website development platforms
CO3	Explore different payment gateways for marketing and finance
CO4	Apply security and privacy measures in e-commerce systems.
CO5	Benefits and opportunities in B2B
CO6	Understand the legal and regulatory frameworks governing e-commerce, including consumer protection laws, privacy regulations, and intellectual property rights.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction:** Introduction to ecommerce: Meaning and concept of ecommerce, ecommerce vs e-business, advantages and disadvantages of ecommerce, value chain in e-commerce, Porter's value chain model, competitive advantage and competitive strategy,	4
M2	**Fundamental of e-commerce:** different types of ecommerce like B2B, B2C, C2C, C2B, G2C Technology in ecommerce: An overview of the internet, basic network architecture and the layered model, internet architecture, network hardware and software considerations, intranets and extranets, The making of world wide web, web system architecture, ISP, URL's and HTTP, cookies. **Building and hosting your website:** choosing an ISP, registering a domain name, web promotion, internet marketing techniques, e-cycle of internet marketing, personalization, mobile agents, tracking customers, customer service, CRM and e-value	8
M3	**E-payment, marketing and finance**: Transactions through Internet, Requirements of e-payment systems, Functioning of debit and credit cards, Impact of e-commerce on market, Marketing issues in e- marketing, direct marketing, Areas of e-financing**,** E-banking, Traditional v/s E-banking.	8

M4	**Security threats:** Security in cyberspace, kinds of threats and crimes: client threat, communication channel threat, server threat, other programming threats, frauds and scams Basic cryptography for enabling security in e-commerce: encryption: public and private key encryption, authentication and trust using digital signature and digital certificates, internet security using VPN, firewalls, SSL Internet payment systems: Features of payment methods, 4C payment methods, electronic money, ACID and ICES test, payment gateway, SET protocol for credit card payment, electronic payment media: e-cash and e-wallet, e-check, credit card, debit card, smart card, EFT and ACH, Cyber security.	8
M5	**Business to Business e-commerce:** Meaning, benefits and opportunities in B2B, B2B building blocks and their relationship to supply chain management, key B2B models and their main functions, EDI as a B2B tool. Consumer oriented e-commerce: traditional retailing and e-retailing, benefits and key success factors for e-retailing, models for e-retailing like specialized and generalized e-stores, e-mall, direct selling by manufacturer, supplementary distribution channel, e-broker and e-services like web-enabling services, matchmaking services, information selling on the web, entertainment services and auction services.	8
M6	**E-core values:** ethical issues, legal issues, taxation issues and international issues.	4

SUGGESTED READING:

1. Electronic Commerce: A managerial Perspective Efraim Turban, Jae Lee, David King, H Michael Chung -Pearson Education.
2. E-Commerce – Business, Technology, Society Kenneth C Laudon, Carol Guercio Traver (Pearson Education)
3. E-Commerce: Strategy, Technologies and Applications, David Whiteley- Tata McGraw Hill.

SUBJECT NAME: SOCIETY CULTURE AND HUMAN BEHAVIOR SUBJECT

CODE: BCA24-AEC-406

CREDIT: 2

CONTACT HOURS: 24

COURSE OBJECTIVES:

- To explore the relationship between society, culture and human behaviour
- To analyse the impact of social norms, values and beliefs on individual and collective behaviour
- To examine the cultural diversity and its influence on social interactions and perceptions

.

COURSE OUTCOME	
CO1	Understand the demographic characteristics and population trends of India.
CO2	Learn about Indian society, culture, and how they differ from Western culture.
CO3	Understand social stratification including caste, class, and constitutional provisions for weaker sections.
CO4	Identify major socio-economic problems faced by Indian society.
CO5	Gain basic knowledge of human behaviour and factors that influence it.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Demographic Profile:** Characteristics of Indian Population, Population Growth, Age, Sex, Religion, Language, Occupations, National Policy on Population	6
M2	**Indian Society and culture:** Society and its types, Culture – Features, Characteristics and Diversity. Differences with Western Culture,	6
M3	**Social Stratification:** Caste System, Class System, Communities, Ethnic Groups, Weaker Section and Minorities, Constitutional Provisions for Scheduled Castes, Scheduled Tribes and other Backward Classes.	4
M4	**Socio-Economic Problems**: Poverty, Illiteracy, Unemployment, Housing, Child Labour, Migration, Occupational Diseases, Insurgency, Terrorism, Crime, Project Affected People, Social Destitute, Beggary, Aged Population, Juvenile Delinquency, Problems in Family Life.	4
M5	**Introduction to Human Behaviour:** Overview of human behaviour, Importance of studying human behaviour, determinants of human behavior	4

SUGGESTED READING:

1. " Society and Politics in India " by Andre Beteille - Publisher: OUP
2. " Society and Politics in India " by Ram Ahuja - Publisher: Rawat Publications
3. " Social Structure and Caste and Other Essays " by M.N. Srinivas - Publisher: OUP
4. " Text Book on Indian Society " by NCERT - Publisher: NCERT
5. " Tribe, Caste and Religion in India " by R. Thapar (ed.) - Publisher: Macmillian

Practical:

SUBJECT NAME: DBMS Lab

SUBJECT CODE: BCA24-CC-491

Credit: 2

Course Objectives:

1. To elucidate fundamental database principles, applications, data models, schemas, and instances.
2. To illustrate the application of constraints and operations in relational algebra.
3. Explain the fundamentals of SQL and formulate queries utilizing SQL.
4. To underscore the significance of normalization in databases.
5. To assist students with database design
6. To understand the principles of concurrency control and transaction management.

COURSE OUTCOME	
CO1	The student is exposed to a commercial RDBMS environment, such as Oracle.
CO2	The student will acquire the knowledge of SQL commands for the purpose of data definition and manipulation.
CO3	The learner comprehends conceptual concepts through the design of physical databases.
CO4	The student applies the design phases to a case study.

DETAILED SYLLABUS:

Experiment 1

Students should decide on a case study and formulate the problem statement.

Experiment 2

Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)

Note: Students are required to submit a document by drawing an ER Diagram to the Lab teacher.

Experiment 3

Converting ER Model to Relational Model (Represent entities and relationships in Tabular form, represent attributes as columns, identifying keys)

Note: Students are required to submit a document showing the database tables created from ER Model.

Experiment 4

Normalization -To remove the redundancies and anomalies in the above relational tables, Normalize up to Third Normal Form

Experiment 5

Creation of Tables using SQL- Overview of using SQL tool, Data types in SQL, Creating Tables (along with Primary and Foreign keys), Altering Tables and Dropping Tables

Experiment 6

Practicing DML commands- Insert, Select, Update, Delete

Experiment 7

Practicing Queries using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, CONSTRAINTS etc.

Experiment 8

Practicing Sub queries (Nested, Correlated) and Joins (Inner, Outer and Equi).

Experiment 9

Practice Queries using COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING, VIEWS Creation and Dropping.

Experiment 10

Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger

Experiment 11

Procedures- Creation of Stored Procedures, Execution of Procedure, and Modification of Procedure.

Experiment 12

Cursors- Declaring Cursor, Opening Cursor, Fetching the data, closing the cursor**.**

SUGGESTED READING:

1. "Database Management Systems" by Raghu Ramakrishnan, Johannes Gehrke - Publisher: McGraw-Hill Education
2. "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, S. Sudarshan - Publisher: McGraw-Hill Education
3. "Fundamentals of Database Systems" by Ramez Elmasri, Shamkant B. Navathe - Publisher: Pearson
4. "Database Management Systems" by Ivan Bayross - Publisher: BPB Publications.

Curriculum

for

Bachelor of Computer Applications
(BCA)

Regulation – 24

(Under Autonomy)

GURU NANAK INSTITUTE OF TECHNOLOGY

157/F, Nilgunj Road, Sodepur, Kolkata-114

Affiliated to -

Maulana Abul Kalam Azad University of Technology

(Formerly known as WBUT)

Program Structure							
SEMESTER	**THEORY**		**PRACTICAL**		**SESSIONAL**		**Semester wise Credits [A+B+C]**
	Courses	**Credits [A]**	**Courses**	**Credits [B]**	**Courses**	**Credits [C]**	
I	5	13	2	4	2	5	22
II	5	13	2	4	2	5	22
III	5	15	2	4	1	2	21
IV	6	17	1	2	0	0	19
V	4	12	2	4	1	4	20
VI	5	16	2	4	0	0	20
VII	5	15	1	2	1	3	20
VIII	2	8	2	4	1	8	20
TOTAL CREDIT							**164**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-I								
SL. No.	**Course Type**	**Course Code**	**Course Name**	**Contact Hours / Week**				**Credit**
				L	**T**	**P**	**TOTAL**	
THEORY								
1	Core Courses (CC)	BCA24-CC-101	Digital Electronics	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-102	Programming for Problem Solving through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-103	Principles of Management	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-104	English & Professional Communication	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets A or D	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-191	Digital Electronics Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-192	Programming for Problem Solving Lab	0	0	4	4	2

SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-181	Life Skills & Personality Development	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-182A	Yoga	0	0	6	6	3
	Value Added Courses (VAC)	BCA24-VAC-182B	Health & Wellness	0	0	6		
	Value Added Courses (VAC)	BCA24-VAC-182C	Sports	0	0	6		
Total Credit								**22**
Total Contact Hours								**29**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-II

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-201	Computer Architecture	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-202	Basics of Web Design Using Html, CSS, Java Script	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-203	Organization Behaviour	2	0	0	2	2
4	Ability Enhancement Courses (AEC)	BCA24-AEC-204	Modern Indian Languages and Literature	2	0	0	2	2
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets B or E	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-291	Computer Architecture Lab	0	0	4	4	2

7	Core Courses (CC)	BCA24-CC-292	Basics of Web Design Using Html, CSS, Java Script Lab	0	0	4	4	2
SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-281	IT Skills	2	0	0	2	2
9	Value Added Courses (VAC)	BCA24-VAC-282A	Critical Thinking	0	0	4	6	3
	Value Added Courses (VAC)	BCA24-VAC-282B	NSS	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282C	Mental Health	0	0	4		
	Value Added Courses (VAC)	BCA24-VAC-282D	Environmental Studies	0	0	4		
Total Credit								**22**
Total Contact Hours								**29**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-III

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-301	Python Programming	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-302	Data Structure through C	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-DSE-303	Principles of Marketing	2	1	0	3	3
4	Ability Enhancement Courses (AEC)	BCA24-AEC-304	The Constitution, Human Rights and Law	2	1	0	3	3
5	Multi-Disciplinary Elective Course(MEC)	**	Any one from GE baskets C or F	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-391	Python Programming Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-392	Data Structure Lab	0	0	4	4	2

SESSIONAL								
8	Skill Enhancement Courses (SEC)	BCA24-SEC-381	Understanding Basics of Cyber Security	0	0	4	4	2
Total Credit								**21**
Total Contact Hours								**27**
**** For Course Code - refer GE basket papers**								

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-IV

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-401	Data Base Management System	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-402	Operating System	2	1	0	3	3
3	Core Courses (CC)	BCA24-CC-403	Software Engineering	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-404	Human resource Management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-405	E-Commerce	2	1	0	3	3
6	Ability Enhancement Courses (AEC)	BCA24-AEC-406	Society Culture and Human Behavior	2	0	0	2	2
PRACTICAL								
7	Core Courses (CC)	BCA24-CC-491	DBMS Lab	0	0	4	4	2

		Total Credit	**19**
Total Contact Hours			**21**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-V

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-501	PHP WITH MYSQL	3	1	0	4	4
2	Core Courses (CC)	BCA24-CC-502	Object Oriented Programming with Java	3	1	0	4	4
3	Discipline Specific Elective (DSE)	BCA24-DSE-503	Entrepreneurship	2	0	0	2	2
4	Discipline Specific Elective (DSE)	BCA24-DSE-504	Financial management	2	0	0	2	2
PRACTICAL								
5	Core Courses (CC)	BCA24-CC-591	PHP WITH MYSQL LAB	0	0	4	4	2

6	Core Courses (CC)	BCA24-CC-592	Object Oriented Programming with Java Lab	0	0	4	4	2
SESSIONAL								
7	Internship (INT)	BCA24-INT-581	Industrial Internship			4	4	4
		Total Credit						**20**
Total Contact Hours								**24**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VI								
SL. No.	**Course Type**	**Course Code**	**Course Name**	**Contact Hours / Week**				**Credit**
				L	**T**	**P**	**TOTAL**	
THEORY								
1	Core Courses (CC)	BCA24-CC-601	Advance Java With Web Application	2	1	0	3	3
2	Core Courses (CC)	BCA24-CC-602	Unix and Shell Programming	2	1	0	3	3

3	Skill Enhancement Courses (SEC)	BCA24-SEC-603	Networking	3	1	0	4	4
4	Discipline Specific Elective (DSE)	BCA24-DSE-604	Customer relationship management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-605	Career planning and management	2	1	0	3	3
PRACTICAL								
6	Core Courses (CC)	BCA24-CC-691	Advance Java With Web Application Lab	0	0	4	4	2
7	Core Courses (CC)	BCA24-CC-692	Unix and Shell Programming Lab	0	0	4	4	2
Total Credit								**20**
Total Contact Hours								**24**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VII

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-701A	Data Mining & Data Warehousing	2	1	0	3	3
	Core Courses (CC)	BCA24-CC-701B	Machine Learning	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701C	Pattern Recognition	2	1	0	3	
	Core Courses (CC)	BCA24-CC-701D	Algorithm Analysis	2	1	0	3	
2	Core Courses (CC)	BCA24-CC-702	Cyber Security	2	1	0	3	3
3	Discipline Specific Elective (DSE)	BCA24-SEC-703	Research Methodology	2	1	0	3	3
4	Discipline Specific Elective (DSE)	BCA24-DSE-704	Consumer Behavior	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DSE-705	Strategic management	2	1	0	3	3

PRACTICAL								
6	Core Courses (CC)	BCA24-CC-791A	Data Mining & Data Warehousing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-791B	Machine Learning Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791C	Pattern Recognition Lab	0	0	4	4	
	Core Courses (CC)	BCA24-CC-791D	Algorithm Analysis Lab	0	0	4	4	
SESSIONAL								
7	Research Project (RP)	BCA24-RP-781	Project -1	0	0	6	6	3
Total Credit								**20**
Total Contact Hours								**25**

CURRICULUM
Course : Bachelor of Computer Applications (BCA)
Under Autonomy, following NEP-2020 structure (Course Duration - 4 years)

SEMESTER-VIII

SL. No.	Course Type	Course Code	Course Name	Contact Hours / Week				Credit
				L	T	P	TOTAL	
THEORY								
1	Core Courses (CC)	BCA24-CC-801A	Cloud Computing	3	1	0	4	4
	Core Courses (CC)	BCA24-CC-801B	Blockchain Technology	3	1	0	4	4
	Core Courses (CC)	BCA24-CC-801C	Artificial Intelligence	3	1	0	4	4
2	Core Courses (CC)	BCA24-CC-802	Statistical Analysis with R Programming	3	1	0	4	4
PRACTICAL								
3	Core Courses (CC)	BCA24-CC-891A	Cloud Computing Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-891B	Blockchain Technology Lab	0	0	4	4	2
	Core Courses (CC)	BCA24-CC-891C	Artificial Intelligence Lab	0	0	4	4	2
4	Core Courses (CC)	BCA24-CC-892	Statistical Analysis with R Programming Lab	0	0	4	4	2

SESSIONAL								
5	Skill Enhancement Courses (SEC)	BCA24-SEC-881	Research Project – 2	0	0	16	16	8
Total Credit								**20**
Total Contact Hours								**32**

SEMESTER – V

SUBJECT NAME: PHP WITH MYSQL

SUBJECT CODE: BCA24-CC-501

CREDIT: 4

CONTACT HOURS: 48

COURSE OBJECTIVE:

1. To understand the fundamentals of PHP programming
2. To learn to design and manage relational databases using MySQL
3. To develop skills to integrate PHP with MySQL
4. To implement form handling and server-side validation
5. To design and deploy database-driven web applications using PHP and MySQL

COURSE OUTCOME:

After successful completion of this course, students will be able to:

CO1: Explain the basic concepts of server-side scripting and write simple programs using PHP syntax and control structures.

CO2: Design and create relational databases using MySQL, including tables, keys, and basic SQL queries.

CO3: Develop PHP programs to connect with MySQL databases and perform CRUD (Create, Read, Update, Delete) operations.

CO4: Implement form handling, session management, and basic security techniques in PHP-based web applications.

CO5: Design and develop a complete dynamic web application using PHP and MySQL for data storage and retrieval.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction to Web Development:** Overview of web development, server vs. client-side, HTML basics, introduction to PHP and MySQL Setting up Environment: Installation of XAMPP/WAMP,	8

	introduction to Apache, MySQL, and PHP. Configuring a development environment	
M2	**PHP Basics:** PHP syntax, variables, data types, operators, and control structures. Functions in PHP: Defining and using functions, function scope, including files, and built-in functions Arrays and Strings: Working with arrays, array functions, string manipulation, and string functions	10
M3	**Forms Handling and User Input:** Handling form data, GET vs. POST methods, validating and sanitizing user input **PHP and MySQL Integration:** Connecting PHP to MySQL, executing queries, retrieving data, and displaying data in web pages Implementing Create, Read, Update, Delete (CRUD) operations using PHP and MySQL	10
M4	**Session Management:** Understanding sessions and cookies, creating and managing sessions in PHP. **User authentication:** Building User Login system , Password Hashing. Error Handling andFile Handling In PHP: Reading, Writing and uploading files. Security in PHP: SQL injection prevention, XSS protection, securing file uploads. **Advanced PHP Concepts:** Object-Oriented PHP, classes, objects, inheritance, and PHP's built-in OOP features	10
M5	**Introduction to PHP Frameworks:** Overview of popular PHP frameworks (e.g., Laravel, CodeIgniter), basic MVC architecture concepts **Laravel FrameWork:** Introduction to Laravel, Understanding routing in Laravel, creating and using controllers, passing data to views, and route parameters. Introduction to Blade templating, using Blade directives, template	10

	inheritance, and displaying data in views. Overview of Eloquent ORM, defining models, basic CRUD operations, database migrations, and relationships.	

SUGGESTED READING:

1. Gilmore, W. J. (2010). Beginning PHP and MySQL: From Novice to Professional (4th ed.). Apress.
2. Naramore, E., Gerner, J., Scouarnec, Y. L., Stolz, J., & Glass, M. (2005). Beginning PHP5, Apache, and MySQL Web Development. Wiley India Pvt. Ltd.
3. Welling, L., & Thomson, L. (2009). PHP and MySQL Web Development (4th ed.). Pearson Education.
4. Beighley, L., & Morrison, M. (2008). Head First PHP & MySQL. O'Reilly Media.
5. Powers, D., & McGrath, M. (2015). PHP & MySQL in Easy Steps. McGraw Hill Education.
6. Robson, E., & Freeman, E. (2007). Head First PHP & MySQL. O'Reilly Media.
7. Gosselin, D., Kokoska, R., & Easterbrooks, P. (2010). PHP Programming with MySQL: The Web Technologies Series (2nd ed.). Cengage Learning.
8. Sharma, V. (2017). PHP with MySQL: A Practical Approach. BPB Publications.
9. Narayan, N. (2016). PHP & MySQL: Server-side Web Development. McGraw Hill Education. Zandstra, M. (2014). PHP Objects, Patterns, and Practice (4th ed.). Apress.

SUBJECT NAME: Object Oriented Programming with Java
SUBJECT CODE: BCA24-CC-502
Credit: 4
CONTACT HOURS : 48

COURSE OBJECTIVE:

1. **To introduce the fundamental concepts of Object-Oriented Programming,**
2. **To develop programming skills using Java syntax and constructs, data types, operators, control structures, arrays, and methods.**
3. **To design and implement object-oriented solutions using classes and objects**
4. **To learn advanced Java features, like - packages, interfaces, exception handling, multithreading etc.**
5. **To develop the ability to build modular and reusable programs using object-oriented design principles.**

COURSE OUTCOME

CO1: Explain the fundamental concepts of Object-Oriented Programming such as classes, objects, inheritance, polymorphism, abstraction, and encapsulation using Java.

CO2: Develop Java programs using basic programming constructs, control structures, arrays, and methods.

CO3: Apply object-oriented principles in Java to design reusable and modular programs using classes and objects.

CO4: Implement advanced OOP features such as inheritance, interfaces, packages, exception handling, and multithreading in Java programs.

CO5: Design and develop small-scale applications using Java by applying object-oriented design principles.

DETAILED SYLLABUS:

Module	NAME OF THE TOPIC	Hours

No:		
M1	**Introduction to Java:** Overview of Java, its features, setting up the environment, and writing first Java program. PATH AND CLASS PATH VARIABLE, JVM architecture. **Basics of Java Programming:** Data types, variables, operators, control structures, and loops. Storing of Big Integer. Use of Static variable, final variable, initialization of static and final variable.	10
M2	**Object-Oriented Programming Concepts:** Access modifiers, encapsulation, and abstraction in Java. Classes, objects, methods, and different types of initialization. Calling a constructor from a constructor, constructor chaining. Inheritance and Polymorphism: Inheritance, method overloading, method overriding, and polymorphism. Restriction on method overriding.	10
M3	**Arrays and Strings:** Single-dimensional and multi-dimensional array. Use of Arrays class for printing, sorting, searching. string handling, and use of StringBuffer and StringBuilder. **Interfaces and Abstract Classes:** Understanding interfaces, abstract classes, and multiple inheritance in Java.	10
M4	**Exception Handling:** Checked and Unchecked Exception, Try-catch blocks, multiple catch blocks, finally, throw, throws, and custom exceptions. **File I/O and Serialization:** File handling, reading and writing to files, and serialization in Java.	10
M5	Multithreading: Basics of threads, thread lifecycle, synchronization, and inter-thread communication.	8

SUGGESTED READING:

1. Schildt, H. (2018). Java: The Complete Reference (11th ed.). McGraw Hill Education.
2. Horstmann, C. S., & Cornell, G. (2019). Core Java Volume I – Fundamentals (11th ed.). Pearson Education.

3. Balagurusamy, E. (2020). Object-Oriented Programming with Java (7th ed.). McGraw Hill Education.
4. Sierra, K., & Bates, B. (2005). Head First Java (2nd ed.). O'Reilly Media.
5. Deitel, P., & Deitel, H. (2018). Java: How to Program (11th ed.). Pearson Education.
6. Liang, Y. D. (2018). Introduction to Java Programming and Data Structures (11th ed.). Pearson Education.
7. Halterman, R. L. (2005). Object-Oriented Programming in Java. WCB/McGraw Hill.
8. Tanweer Alam (2021). Core JAVA. Khanna Publishing House.
9. Tanweer Alam (2020). Object Oriented Systems with Java 2.0. Khanna Publishing House.
10. Arunesh Goyal (2020). The Essentials of Java. Khanna Publishing House.

SUBJECT NAME: Entrepreneurship

SUBJECT CODE: BCA24-DSE-503

Credit: 2

CONTACT HOURS : 24

COURSE OBJECTIVE:

1. **To introduce the concept and importance of entrepreneurship and its role in economic and social development.**
2. **To develop entrepreneurial skills and mindset required for identifying business opportunities and taking calculated risks.**
3. **To familiarize students with the process of starting and managing a new venture, including idea generation, planning, and resource management.**
4. **To provide knowledge about business planning, financing, and marketing strategies required for successful entrepreneurship.**
5. **To encourage innovation, creativity, and leadership abilities necessary for becoming successful entrepreneurs.**

Course Outcome:

After successful completion of this course, students will be able to:

CO1: Explain the concept, characteristics, and importance of entrepreneurship in economic development.

CO2: Identify business opportunities and evaluate the feasibility of entrepreneurial ideas.

CO3: Prepare a basic business plan including marketing, financial, and operational aspects.

CO4: Analyze the challenges and risks involved in starting and managing a new venture.

CO5: Demonstrate entrepreneurial skills such as creativity, innovation, leadership, and decision-making in developing business ideas.

MODUL	COURSE CONTENT	Hours

E NO.		
1	**Introduction to Entrepreneurship:** Meaning and concept of entrepreneurship, The history of entrepreneurship development, Factors influencing entrepreneurship, Theories of Entrepreneurship, Role and Importance of Entrepreneurship in Economic Growth, New generations of entrepreneurship viz. social entrepreneurship, Health entrepreneurship, Tourism entrepreneurship, Women entrepreneurship etc., Creativity and entrepreneurship, Steps in Creativity, Barriers to entrepreneurship	4
2	**Introduction to entrepreneur:** Meaning and concept of entrepreneur, types of entrepreneur,Characteristics of Entrepreneurs, Functions of entrepreneur	4
3	**Entrepreneurial Motivation:** Entrepreneurial Motivation, Need for Achievement Theory, Maslow's theory, Herjburg's theory, McGragor's Theory, Risk-taking Behavior, Innovation and Entrepreneur	6
4	**Project Management:** Ideas – Sources, processing; Input Requirements, Sources of Financing, Technical Assistance, Marketing Assistance, Preparation of Feasibility Reports, Legal Formalities and Documentation.	6
5	**Organisation Assistance :** Assistance to an entrepreneur, New Ventures Industrial Park (Meaning, features, & examples), Special Economic Zone (Meaning, features & examples),Financial assistance by different agencies MSME, The Small Industries Development Bank of India(SIDBI),The State Small Industries Development Corporation(SSIDC)	4

Suggested Readings:

1. Entrepreneurship – Anindita Sarkar – Taurean Publications
2. Entrepreneurship Development and Project Management – Dr. Dilip M. Sarwate – Everest Publishing House

SUBJECT NAME: Financial management

SUBJECT CODE: BCA24-DSE-504

Credit: 2

CONTACT HOURS : 24

COURSE OBJECTIVE:

1. **To introduce the basic concepts and scope of financial management and its importance in business decision-making.**
2. **To develop an understanding of financial planning and control.**
3. **To learn investment decision techniques, such as capital budgeting methods.**
4. **To gain knowledge about financing decisions, sources of finance and cost of capital.**
5. **To understand working capital management and the management of short-term financial resources in an organization.**

Course Outcome:

After successful completion of this course, students will be able to:

CO1: Explain the principles and functions of financial management in business organizations.

CO2: Analyze financial statements to evaluate the financial performance of a company.

CO3: Apply capital budgeting techniques to evaluate investment proposals.

CO4: Assess different sources of finance and determine the cost of capital for business decisions.

CO5: Evaluate working capital requirements and manage short-term financial resources effectively.

MODULE NO.	COURSE CONTENT	Hours
1	**Introduction:** Concepts, Nature, Scope, Function and Objectives of Financial Management. Basic Financial Decisions: Investment, Financing and Dividend Decisions. Financial goals - Profit vs. Wealth Maximization; Finance Functions – Investment, Financing and Dividend Decisions – Cost of Capital – Significance of Cost of Capital – Calculation of Cost of Debt – Cost of Preference Capital – Cost of Equity Capital (CAPM Model and Gordon's Model) and Cost of Retained Earnings – Combined Cost	6

	of Capital (weighted/Overall).	
2	**Analysis and Interpretation of Corporate Final Accounts:** Understanding the Parameters of health of Business: Liquidity, Profitability, Solvency and Efficiency through learning computation, analysis and interpretation of various tools of financial analysis Preparation of Cash Flow Statement as per Accounting Standard and its Analysis Capital Budgeting – Nature of Investment Decisions – Investment Evaluation criteria – Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period, Accounting Rate of Return (ARR) – NPV and IRR comparison.	6
3	**Leverage Analysis:** Developing the Concept of Leverage in Finance. Computation and inferences of Degree of Operating Leverage, Financial Leverage and Combined Leverage – Measurement of Leverages – Effects of Operating and Financial Leverage on Profit – Analyzing Alternate Financial Plans - Capital Structure Theories - Traditional approach - M.M. Hypotheses – without Taxes and with Taxes – Net Income Approach (NI) – Net Operating Income Approach (NOI) - Determining capital structure in practice.	4
4	**Investment Decisions:** Analysis of Risk and Uncertainty. Concept and Computation of Time Value of Money, DCF and Non DCF methods of Investment Appraisal. Project selection on the basis of Investment Decisions. Valuating Investment Proposals for Decision Making. Capital Rationing Dividend Policies – Issues in Dividend Decisions – Relevance Theory – Walter's Model – Gordon's Model – Irrelevance Theory – M-M hypothesis - Dividend Policy in Practice – Forms of Dividends – Stability in Dividend Policy – Corporate Dividend Behaviour.	4
5	**Management of Working Capital:** Concepts, components, Determinants, need, Significance and types of Working Capital – Calculating Operating Cycle Period and Estimation of Working Capital Requirements – Financing of Working Capital and norms of Bank Finance – Sources of Working capital – Factoring services–Various committee reports on Bank Finance – Dimensions of Working Capital Management, Computation of Working Capital for a	4

	Company.	

Suggested Readings:

1. Financial Management: Theory and Practice - by Prasanna Chandra
2. Financial Management" by I. M. Pandey
3. Financial Management: Principles and Applications" by S. N. Maheshwari
4. Strategic Financial Management" by Ravi M. Kishore
5. Financial Management: Text, Problems and Cases" by M. Y. Khan and P. K. Jain.

Practical:
SUBJECT NAME: PHP WITH MYSQL LAB
SUBJECT CODE: BCA24-CC-591
Credit: 2
Contact Hours : 48

Course Objective:
The students will learn

1. **To provide hands-on experience in PHP programming for developing dynamic web pages.**
2. **To create and manage MySQL databases for web applications.**
3. **To connect PHP with MySQL and performing database operations.**
4. **To design and implement web forms and handling user input using PHP.**
5. **To develop the ability to build small database-driven web applications using PHP and MySQL.**

Course Outcomes

CO1: Develop basic PHP programs using variables, operators, and control structures.

CO2: Create and manage MySQL databases, tables, and execute SQL queries.

CO3: Implement PHP scripts to connect with MySQL databases and perform CRUD operations.

CO4: Design web forms and implement server-side validation using PHP.

CO5: Develop a simple dynamic web application integrating PHP and MySQL.

MODULE NUMBER	Name of the topic
1	**User Registration and Login System** Case Study: A website needs a secure system for user registration and login, allowing users to create accounts and access personalized content. Develop a PHP and MySQL-based system where users can register with a username and password, and log in to access their profile page. Implement password hashing for security.
2	**Content Management System (CMS)**

	Case Study: A blog site requires a CMS that allows authors to write, edit, and publish articles. Design a CMS using PHP and MySQL where authors can log in, create new posts, edit existing posts, and delete posts. The system should display posts to the public in a structured format.
3	**Online Voting System** Case Study: An organization wants to conduct online elections where members can vote for their preferred candidates. Create a PHP and MySQL-based voting system where users can register, vote for candidates, and view voting results. Ensure that each user can vote only once.
4	**E-commerce Product Catalog** Case Study: An online store needs to manage its product catalog, allowing users to browse products by category and view product details. Implement a product catalog system in PHP and MySQL where users can browse products by category, search for specific products, and view detailed descriptions and prices.
5	**Event Management System** Case Study: A company needs a system to manage events, including registration, scheduling, and participant lists. Develop a PHP and MySQL-based event management system where users can register for events, view event schedules, and check participant lists.
6	**Forum or Discussion Board** Case Study: A community website needs a forum where users can post topics, reply to discussions, and view threads. Build a forum using PHP and MySQL where users can create new discussion threads, reply to existing threads, and manage their posts. Implement user authentication to control access.

Practical:

SUBJECT NAME: Object Oriented Programming with Java Lab

SUBJECT CODE: BCA24-CC-592

Credit : 2

Contact Hours : 48

Course Objective:

The students will learn

1. **To provide practical exposure to Java programming using basic syntax, control structures, and data types.**
2. **To develop programming skills using classes and objects in Java.**
3. **To demonstrate the implementation of object-oriented concepts such as inheritance, polymorphism, encapsulation, and abstraction.**
4. **To enable students to implement advanced Java features such as packages, interfaces, and exception handling.**
5. **To develop the ability to design and implement small applications using object-oriented programming principles in Java.**

MODULE NUMBER	Name of the topic
1	A library wants to automate book issuing and returning processes. The system should track available books and issued books. Create classes Book, Library, and Member. Implement methods to issue a book to a member, return a book, and display the list of available books.
2	A company requires a payroll system to calculate employee salaries based on hours worked and hourly rate. Develop an Employee class with attributes like name, id, hoursWorked, and hourlyRate. Implement methods to calculate the salary and generate a payroll report for all employees.
3	A bank wants to manage customer accounts and transactions, including deposits, withdrawals, and balance inquiries. Create classes Account, Customer, and Transaction. Implement methods to perform deposits, withdrawals, and display account balance. Handle exceptions for insufficient balance during withdrawals.
4	A rental service needs to manage its fleet of vehicles, including cars, bikes, and trucks, and keep track of their availability. Develop a hierarchy of classes starting with a base class Vehicle and derived classes Car, Bike, and Truck. Implement methods to check

	availability, rent a vehicle, and return a vehicle.
5	A warehouse needs a system to track inventory levels, including adding new items, updating stock, and generating reports. Develop classes Item, Inventory, and Warehouse. Implement methods to add items to inventory, update stock levels, and generate inventory reports.
6	A hotel requires a booking system to manage room reservations, including checking room availability and booking rooms. Design classes Room, Hotel, and Reservation. Implement functionalities to check room availability, book a room, and display booking details.

SUBJECT NAME: Industrial Internship

SUBJECT CODE: BCA24-INT-581

CREDIT: 4

CONTACT HOURS: 48

COURSE OBJECTIVE:

1. **To provide practical exposure to the professional working environment in industry or organizations.**
2. **To enable students to apply theoretical knowledge gained during their academic program to real-world problems.**
3. **To develop technical, communication, and teamwork skills required in a professional workplace.**
4. **To familiarize students with industry practices, tools, and technologies relevant to their field of study.**
5. **To encourage professional ethics, responsibility, and problem-solving abilities through hands-on experience.**

Course Outcomes

CO1: Understand the structure, workflow, and operational practices of an industrial or organizational environment.

CO2: Apply academic knowledge and technical skills to solve practical problems during the internship.

CO3: Demonstrate professional skills such as teamwork, communication, and time management.

CO4: Prepare a technical report documenting the internship experience, tasks performed, and learning outcomes.

CO5: Present and evaluate the knowledge and skills gained during the internship through a seminar or presentation.

Internship to be started after exam of 4th sem (sem break) and completed within 5th sem (weekends)

Syllabus of BCA

(Effective from 2024-25 Academic Sessions)

SEMESTER – VI

SUBJECT NAME: Advance Java With Web Application

SUBJECT CODE: BCA24-CC-601

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

1. **To introduce advanced features of Java used in developing dynamic web applications.**
2. **To provide knowledge of server-side programming using Servlets and JSP for web development.**
3. **To develop skills in designing and implementing database-driven web applications using Java.**
4. **To learn session management, cookies, and web application architecture.**
5. **To build and deploy dynamic web applications using Java technologies.**

Course Outcomes

CO1: Explain the concepts and architecture of Java-based web applications.

CO2: Develop server-side programs using Java Servlets for handling client requests and responses.

CO3: Create dynamic web pages using JSP and integrate them with backend logic.

CO4: Implement database connectivity in web applications using Java and SQL.

CO5: Design and develop a complete web-based application using advanced Java technologies.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction to Java EE:** Overview of Java EE Architecture; Difference between Java SE and Java EE; Role of JDBC, JSP, and Servlets in Web Applications; Role of JDBC, JSP, and Servlets in Web Applications	4
M2	**JDBC (Java Database Connectivity):** Introduction to JDBC; JDBC Drivers and Architecture; JDBC Drivers and Architecture; Connecting to Databases; Executing SQL Queries (SELECT, INSERT, UPDATE, DELETE); Use of Statement and Prepared Statement; Result set and Metadata; Transaction management; Batch Processing; commit, rollback, save point	8

M3	**Java Sever Pages:** Introduction to JSP; JSP Lifecycle; JSP syntax and directives; Scriplet, Expression and declaration; JSP Implicit objects; JSP directives; JSP Action Element; Java Beans in JSP; Introduction to JSP Expression Language; Introduction to JSTL Core Tags(<c:if>, <c:choose>, <c:when>, <c:otherwise>, <c:forEach>, <c:forTokens>, <c:param>) and JSTL Functions; Custom Tag Library	6
M4	**Servlet:** Introduction to Servlets; Servlet Life cycle; Handling HTTP request and Responses; Purpose and use Servlet Deployment descriptor File; ServletContext and ServletConfig ; Session Management and Cookie; Servlet chaining and Filters; File Upload and download in servlet	6
M5	**JSP and Servlet :** Combining JSP and Servlets; Model View controller Architecture; Forwarding requests between JSP and Servlet	6
M6	**Hibernate Framework :** Overview of Hibernate Framework; Advantages of ORM over JDBC; Hibernate Architecture and Core Components; Setting Up Hibernate in a Java Application; Mapping Java Classes to Database Tables; Hibernate Configuration (XML and Annotations); Basic CRUD Operations: Save, Update, Delete, Retrieve Hibernate Query Language (HQL) Basics	6

SUGGESTED READING:

1. **D. Deepa; E. Srividhya, Java Programming for IoT, Khanna Publishing House.**
2. **Kogent Learning Solutions, JDBC 4.0, Dreamtech Press, 1st Edition**
3. **R. S. Gohil, JDBC Programming, Laxmi Publications, 1st Edition**
4. **S. G. T. Raghavan, Java and JDBC, Oxford University Press, 2nd Edition**
5. **K. S. Shankar, Java Database Programming with JDBC, Wiley India, 1st Edition**
6. **Kogent Learning Solutions, Java Server Programming (JSP, Servlets) Black Book, Dreamtech Press, 1st Edition**
7. **Budi Kurniawan, Java Servlet & JSP, Wrox Press, 2nd Edition**
8. **Hans Bergsten, JavaServer Pages, O'Reilly Media, 3rd Edition**
9. **S. R. S. Sharma, Servlet & JSP Programming, PHI Learning, 1st Edition**
10. **Ramesh F. Gujjula, Mastering Hibernate, BPB Publications, 1st Edition**
11. **Sheema D.; Aiswarya S.; A. Lakshna, Java Programming, Khanna Publishing House**
12. **S. Vijayalakshmi, Hibernate: Java Persistence Framework, Pearson Education India, 1st Edition**
13. **K. M. S. R. Anjaneyulu, Java Hibernate, Laxmi Publications, 1st Edition**

SUBJECT NAME: Unix and Shell Programming

SUBJECT CODE: BCA24-CC-602

Credit: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

1. **To introduce the fundamentals of the Unix operating system and its command-line environment.**
2. **To learn Unix file system structure and basic commands for file and directory management.**
3. **To develop skills in using Unix utilities and filters for text processing.**
4. **To provide knowledge of shell programming concepts such as variables, control structures, and scripting.**
5. **To enable students to develop shell scripts for automating common system and administrative tasks.**

COURSE OUTCOME

CO1: Demonstrate the use of basic Unix commands for file and directory operations.

CO2: Apply Unix utilities and filters for text processing and data manipulation.

CO3: Write shell scripts using variables, loops, and conditional statements.

CO4: Develop shell programs to automate routine tasks in the Unix environment.

CO5: Analyze and debug shell scripts to improve efficiency and functionality.

DETAILED SYLLABUS:

Module No:	NAME OF THE TOPIC	Hours
M1	**Introduction :** Introduction to Unix; Discuss about POSIX; Discuss about Linux and most popular distributions of Linux; Compare Between the Unix and Linux; Unix system Architecture; Discuss about the Unix kernel and system call interface; Unix directory structure	4
M2	**Unix File commands:** Create directory, change directory, move and copy directory, create file, remove file; remove directory, listing directory information; discuss about the types of files; change file security; creating the empty file and change the	10

	timestamp; discuss the access time, modification time and change time; touch with d and t option; finding the files and directories; soft link and hard link. discuss about i node; size of file system. Use of > and >>, Use of pipe and tee command.	
M3	**Operations on Files :** Row wise and column wise selection from the file with different options, merge lines of files horizontally with different options; split large files into smaller files, counting number of lines, words , characters; sorting the content of the file according to the specific column, numerical sorting, comparing two files line by line, compare two files character by character, compare two sorted files., join the two files, the uniq command, the transformation command.	8
M4	**Utility commands :** cal, date, pr, who, bc, echo, zip unzip, gzip commands, Archiving the file	4
M5	**Vi editor :** Overview of VI Editor as a text editor in Unix/Linux; Basic mode operations in VI (Command mode, Insert mode, and Last-line mode). Basic Operations in VI Editor (Starting VI: Opening and editing files using vi filename, Navigation: Moving the cursor (h, j, k, l, arrow keys, etc.), Moving by word, line, or page. Text Editing (Inserting text in insert mode (i, I, a, A, o, O), Deleting text (x, dd, dw, D, etc.), Copying and pasting (yy, pp, p, P), Undo and redo changes (u, Ctrl+r).). Working with Files (Saving and Exiting (Saving files: :w, :w filename), Exiting: :q, :q! (force quit without saving), Saving and quitting together: :wq, ZZ.). File Operations (Opening a new file: :e filename.) Search and Replace (Searching forward and backward, using regular expressions for searching.) Replace (Replacing text using :s/old/new/g., Global search and replace in a file.)	6
M6	**File Searching and Text Processing Utilities :** Searching the file with pattern using grep and awk command, Advance searching the file with grep, awk command with print and printf, awk with comparison operator, arithmetic operator, begin and else section,Begin and end section, if else statement, built in variable fs and ofs, awk with string and arithmetic functions, use of loops, Use of searching and substitute function.	4
	Process in Unix, Discuss the process command with different options, Discuss about the init process and unis login process, discuss briefly the fork() , getpid(), getppid(), wait(0, zombie process, , pipe() and message(), Discuss Unix process states and the diagram, Discuss about the scheduler used in Unix,	

	swapped memory, discuss about the vmstat and top command, discussion about the nice command	
M&	**Shell programming:** Introduction of shell and types of shell, use of shell, system variables and user defined variable, use of single and double quote and backslash, command substitution, let: assigning and evaluation the expression, take input from the user, Command line parameters, use of if statement, use of for, while and until loop, Observe the exit status.	

SUGGESTED READING:

1. Yashavant Kanetkar, Unix Shell Programming, BPB Publications, 1st Edition
2. Operating System and Unix, S. Gayathri; S. Priyadharshini; N. S. Usha, Khanna Publishing House
3. Sumitabha Das, UNIX: Concepts and Applications, Tata McGraw-Hill Education, 4th Edition
4. Vikas Chawla, Unix and Shell Programming, Oxford University Press, 1st Edition
5. M. G. Venkatesh, Advanced Unix Programming, Wiley India, 1st Edition
6. Stephen G. Kochan, Unix Shell Programming, Pearson Education India, 2nd Edition
7. S. R. Rajesh, UNIX Shell Programming, Pearson Education India, 1st Edition
8. Brian W. Kernighan, The UNIX Programming Environment, Prentice Hall, 1st Edition

SUBJECT NAME: Networking

SUBJECT CODE: BCA24-SEC-603

CREDIT: 4

CONTACT HOURS: 48

COURSE OBJECTIVE:

1. **To introduce the fundamental concepts of computer networking and the importance of network communication.**
1. **To provide knowledge of different types of network architectures, topologies, and transmission media.**
2. **To learn networking models and protocols, particularly the OSI Model and the TCP/IP Model.**
3. **To develop understanding of data communication techniques, switching methods, and network devices.**
4. **To understand network security concepts and basic network management.**

Course Outcomes :

CO1: Explain the basic concepts and components of computer networks.

CO2: Describe different network topologies, transmission media, and networking devices.

CO3: Analyze the layers and functions of the OSI and TCP/IP networking models.

CO4: Explain common networking protocols and data communication techniques.

CO5: Identify basic network security issues and methods used to protect network resources.

DETAILED SYLLABUS

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction:** Definition and Importance of Networking, Components of the network, Network Topology: LAN, MAN, WAN Network Topologies - Star, Ring, Bus, Mesh Reference Models: OSI and TCP/IP reference model, A comparison of the OSI and TCP/IP reference models	6
M2	**Physical Layer:** Data Transmission Concepts, Transmission Media: Guided Media (Twisted pair, Co-axial cable, Optical fiber); Unguided Media (Radio, VHF, microwave, satellite, Infrared), Encoding Schemes: NRZ, Manchester, Differential Manchester; Multiplexing Techniques: FDM, TDM, WDM, Switching Techniques: Circuit, Packet, and Message Switching	8
M3	**Data link layer:** Data Link layer issues, Flow control (stop and wait protocol, sliding window Flow	10

	control),Error Detection Algorithms: Parity Check, CRC, Checksum, Error Correction: Hamming Code Error control(Stop and wait ARQ, Go-back-N ARQ, Selective reject ARQ), HDLC, Multiple Access Protocols (ALOHA, Collision Free Protocols). IEEE Standards for LAN (IEEE802.3, IEEE802.4, IEEE802.5).	
M4	**Network Layer:** Routing algorithm (Shortest path algorithm, Flow based Routing, Distance vector routing, Broadcast routing, Multicast routing); IP Addressing: IPv4 and IPv6, Subnetting and CIDR, Routing Protocols: RIP, OSPF, BGP, NAT and ICMP.	8
M5	**Transport Layer:** Functions of Transport Layer, Protocols - TCP (3-Wayand 4-way Handshaking), UDP, Port Addressing, Congestion Control Mechanisms: Leaky Bucket, Token Bucket **Application Layer Protocols:** DNS, HTTP, HTTPS, FTP, SMTP, POP3, IMAP; Network Applications: Remote Login (Telnet, SSH), File Sharing (NFS, SMB), Domain Name server, Simple network management Protocol.	8
M6	**Emerging Networking concepts:** Cloud Networking Basics, Internet of Things (IoT) Networking Protocols: MQTT, CoAP; Software-Defined Networking (SDN) Concepts	8

SUGGESTED READING:

1. S. Tanenbaum, Computer Networks, Pearson Education India, 5th Edition
2. William Stallings, Data and Computer Communications, Pearson Education India, 9th Edition
3. Bhavneet Sidhu, An Integrated Approach to Computer Networks, Khanna Publishing House.
4. James F. Kurose, Computer Networking: A Top-Down Approach, Pearson Education India, 7th Edition
5. Larry L. Peterson, Computer Networks: A Systems Approach, Elsevier, 5th Edition
6. Behrouz A. Forouzan, Data Communications and Networking, McGraw-Hill Education, 5th Edition
7. Rajendra Prasad, Introduction to Computer Networks, Wiley India, 1st Edition
8. A. Deepa; T. Anitha; M K. Dharani, Computer Networks and Design, Khanna Publishing House

SUBJECT NAME: Customer Relationship Management

SUBJECT CODE: BCA24-DSE-604

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

1. **To introduce the concept and importance of Customer Relationship Management (CRM) in modern business organizations.**
2. **To develop an understanding of strategies for acquiring, maintaining, and retaining customers.**
3. **To familiarize students with CRM tools, technologies, and applications used in managing customer data and interactions.**
4. **To provide knowledge about customer satisfaction, loyalty, and service quality management.**
5. **To enable students to design effective CRM strategies for improving customer relationships and business performance.**

Course Outcomes

CO1: Explain the concepts, objectives, and significance of Customer Relationship Management.

CO2: Identify different strategies used for customer acquisition, retention, and loyalty building.

CO3: Analyze the role of CRM technologies and information systems in managing customer data.

CO4: Evaluate customer service practices and their impact on customer satisfaction and business growth.

CO5: Develop basic CRM strategies for improving customer relationships in an organization.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction :** Evolution of Customer Relationship Management, CRM- Definition, Emergence of CRM Practice, Factors responsible for CRM growth, CRM process, framework of CRM, Benefits of CRM, Types of CRM, Scope of CRM, Customer Profitability, Features Trends in CRM , CRM and Cost-Benefit Analysis, CRM and Relationship Marketing.	6
M2	**Customer Value, Satisfaction, and Relationship Management :** CRM Concepts, Customer Value, Customer Expectation, Customer Satisfaction, Customer Eccentricity, Customer Acquisition, Customer Retention, Customer Loyalty, Customer Lifetime Value. Customer Experience Management, Customer Profitability, Enterprise Marketing Management, Customer Satisfaction Measurements, Web based Customer Support.	6

M3	**CRM Planning Process and Strategic Development :** Planning for CRM Steps in Planning-Building Customer Eccentricity, Setting CRM Objectives, Defining Data Requirements, Planning Desired Outputs, Relevant issues while planning the Outputs, Elements of CRM plan, CRM Strategy: The Strategy Development Process, Customer Strategy Grid.	6
M4	**CRM and Marketing Strategy:** CRM Marketing Initiatives, Sales Force Automation, Campaign Management, Call Centers. Practice of CRM: CRM in Consumer Markets, CRM in Services Sector, CRM in Mass Markets, CRM in Manufacturing Sector.	6
M5	**Implementation of CRM:** Issues and Problems in implementing CRM, Information Technology tools in CRM, Challenges of CRM Implementation. CRM Implementation Road map, Road Map (RM)	6
M6	**Performance Analysis :** Measuring CRM performance, CRM Metrics.	6

SUGGESTED READING:

1. Customer Relationship Management: Anis Chattopadhyay – Taurean Publications
2. Jagdish N.Sheth, Atul Parvatiyar & G.Shainesh, "Customer Relationship Management", Emerging Concepts, Tools and Application", 2010, TMH.
3. Dilip Soman & Sara N-Marandi," Managing Customer Value" 1st edition, 2014, Cambridge.
4. Alok Kumar Rai, "Customer Relationship Management: Concepts and Cases", 2008, PHI.

SUBJECT NAME: Career Planning and Management

SUBJECT CODE: BCA24-DSE-605

CREDIT: 3

CONTACT HOURS: 36

COURSE OBJECTIVE:

1. **To introduce the concept and importance of career planning and management in personal and professional development.**
2. **To help students identify their skills, interests, and career goals for effective career decision-making.**
3. **To develop strategies for career planning, including goal setting, skill development, and career opportunities.**
4. **To familiarize students with job search techniques, resume preparation, and interview skills.**
5. **To enhance professional competencies such as communication, teamwork, and leadership for career growth.**

Course Outcomes

CO1: Explain the importance and process of career planning and management.

CO2: Assess personal strengths, interests, and career aspirations.

CO3: Develop a career plan with clear goals and strategies for professional development.

CO4: Demonstrate job search skills including resume writing and interview preparation.

CO5: Apply professional and interpersonal skills required for career advancement.

DETAILED SYLLABUS:

MODULE NO:	NAME OF THE TOPIC	HOURS
M1	**Introduction to Career Planning and Management:** Define the starting point, career anchors, behavioral models, personality typology	8
M2	**BEHAVIORAL TRAITS :** Identification of Behavioral Traits , Understanding key traits such as adaptability, leadership, and communication , organizational culture, fostering teamwork and enhancing workplace harmony, Corporate Competencies , problem-solving with competencies that drive career success and organizational performance.	10
M3	**CHOOSING YOUR CAREER :** Researching and Clarifying Company Preferences, Creating a Company Profile, Making Contact with Companies, Understanding Company Functions, and Developing the Resume , preparing yourself for interview	10
M4	**CAREER DEVELOPMENT :** Theories and Models of Career Development, Career Counseling and Decision-Making, Conceptualizing the Interrelationships Among Work, Mental Well being, Relationships, and Other Life Roles, Utilizing Career and Vocational Information Resources, Technologies, and Systems, Strategies for Career Development Program Planning, Organization, Implementation, and	8

	Administration	

SUGGESTED READING:

1. Career Planning and Management – Souvik Ghosh, Krishnarup Chaudhuri, Saswata Kanjilal – Taurean Publications.

Practical:

SUBJECT NAME: Advance Java With Web Application Lab

SUBJECT CODE: BCA24-CC-691

Credit: 2

CONTACT HOURS: 48

Course Objectives:

1. **To provide practical knowledge of developing dynamic web applications using Java technologies.**
2. **To enable students to create server-side applications using Servlets and JSP.**
3. **To develop skills for integrating web applications with databases.**
4. **To demonstrate session management techniques such as cookies and sessions in web applications.**
5. **To build small database-driven web applications using advanced Java technologies.**

Course Outcomes

CO1: Develop and execute web-based programs using Java technologies.

CO2: Implement server-side processing using Java Servlets.

CO3: Create dynamic web pages using JSP and integrate them with backend logic.

CO4: Implement database connectivity in web applications using Java.

CO5: Design and develop a simple web application using advanced Java technologies.

DETAILED SYLLABUS:

Case Study 1: Online Bookstore Application

Scenario:

You are tasked to develop an Online Bookstore web application. The application should allow users to browse books, search for books by title or author, view details, and place orders. Admin users should be able to add, update, or delete book records.

Lab Questions:

1. Servlet Basics

Create a servlet to display the list of books from a database on a web page.

Implement a servlet to handle user searches by book title or author.

2. Session Management

Implement session tracking to maintain the user's cart.

Use HttpSession to store the list of books added to the cart.

3. JDBC Integration

Write a Java program to connect to a database and fetch book records.

Use Prepared Statement to insert, update, and delete book details securely.

4. JSP for Dynamic Pages

Create a JSP page to display the shopping cart's content dynamically.

Use JSTL (Java Server Pages Standard Tag Library) for iteration and conditional rendering.

5. MVC ArchitectureImplement the Model-View-Controller pattern for the application.

Separate business logic (Model) from the presentation (View) and control logic (Controller).

6. Form Validation and Error Handling

Create a user registration form with validation (e.g., email, password strength) using JSP and servlets.

Implement error handling for invalid user input or database connection issues.

Case Study 2 : Employee Management System

Scenario:

Develop a web-based Employee Management System where employees can log in to view their profiles, and administrators can manage employee records.

Lab Questions:

1. Login Authentication

Create a login servlet to authenticate users based on username and password stored in a database.

Redirect users to different pages based on their roles (e.g., Employee or Admin).

2. CRUD Operations with JDBC

Write servlets to add, update, view, and delete employee records in a database.

Ensure proper validation and error handling for all database operations.

3. Pagination and Sorting

Implement pagination to display employee records on the admin dashboard.

Add sorting functionality for columns like Name, Department, and Salary.

4. Email Notification

Use JavaMail API to send an email notification to employees upon record creation or updates.

5. Deployment on Apache Tomcat

Package the application as a WAR file and deploy it on the Apache Tomcat server.

Test the application’s functionality in a live environment.

Practical:

SUBJECT NAME: Unix and Shell Programming Lab

SUBJECT CODE: BCA24-CC-692

Credit: 2

CONTACT HOURS: 48

Course Objectives:

1. **To provide practical knowledge of the Unix operating system and command-line environment.**
2. **To develop skills in using Unix commands for file and directory management.**
3. **To familiarize students with Unix utilities and filters for text processing.**
4. **To develop the ability to write shell scripts for automating system tasks.**
5. **To enable students to implement control structures and loops in shell programming.**

Course Outcomes

CO1: Execute basic Unix commands for file and directory operations.

CO2: Use Unix utilities and filters for text processing and data manipulation.

CO3: Write shell scripts using variables, conditional statements, and loops.

CO4: Develop shell programs to automate routine tasks in the Unix environment.

CO5: Debug and improve shell scripts for efficient execution.

DETAILED SYLLABUS:

Basic Unix Commands

1. **List all files in a directory along with their permissions and ownership.**

   Display the top 10 largest files in a directory using du and sort.

   Find and replace a specific word in a file using sed.

2. **File and Directory Management**

   Write a shell script to create a directory structure for a project (e.g., Project/Docs, Project/Src, Project/Bin) and verify the structure.

   Create a script to back up all .txt files in the current directory into a new directory named Backup_<date>.

3. **Process Management**

   Write a script to list all processes owned by the current user.

   Create a script to monitor CPU usage and alert the user if it exceeds a specific threshold.

4. **Text Processing**

   Use awk to extract and display the second and fourth columns from a CSV file.

   Use grep to find all lines in a file that contain a specific pattern and count the occurrences.

5. **Shell Scripting Basics**

   Write a shell script to calculate the factorial of a number entered by the user.

   Create a script to check if a given file exists and whether it is readable, writable, or executable.

Case Study-Based Lab Questions

System Monitoring Tool

Scenario:

Build a shell script-based tool to monitor and report system performance, including disk usage, memory usage, and active processes.

Lab Questions:

1. **Write a script to display the following system details:**
   - Total and free memory.
   - Disk usage percentage of each mounted partition.
   - Number of active processes.
2. **Implement a feature to save the report to a file with a timestamp in the filename (e.g., System_Report_<date>.txt).**
3. **Extend the script to alert the user if disk usage exceeds 80% or memory usage goes below 10%.**