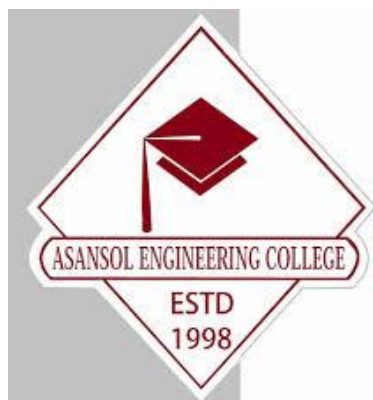


Curriculum
for
**Bachelor of Computer Applications
(BCA)**

Regulation – 24
(Under Autonomy)



ASANSOL ENGINEERING COLLEGE
Vivekananda Sarani, kanyapur, Asansol - 713305,
Paschim Bardhaman

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								

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								

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
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CURRICULUM
Course : Bachelor of Computer Applications (BCA)
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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-DS E-503	Entrepreneurship	2	0	0	2	2
4	Discipline Specific Elective (DSE)	BCA24-DS E-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
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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-DS E-604	Customer relationship management	2	1	0	3	3
5	Discipline Specific Elective (DSE)	BCA24-DS E-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: 40 (2 L + 1 T)

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:

MODU LE NO:	NAME OF THE TOPIC	HOURS	L	T
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.	8	6	2
M2	String and Function (6L)	8	6	2

	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(), 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	7	3
M4	File Management (4L) Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files and directories	4	3	1
M5	Errors and Exception Handling(2L) Dealing with syntax errors, Exceptions, Handling exceptions with try/except, Cleaning up with finally	3	2	1

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	6	1
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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:A Practical Introduction to Programming" by Subin Siby (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 in 7 Days" by Darshan Patel (Publisher: BPB Publications)

SUBJECT NAME: Data Structure through C

SUBJECT CODE: BCA24-CC-302

Credit: 3

CONTACT HOURS : 40 (2L + 1T)

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	L	T
M1	Concepts of data structures: Data and data structure, Abstract Data Type, Algorithms and programs, basic idea of pseudo-code. Algorithm efficiency and analysis,	8	6	2

	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	6	2
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	4	1
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	4	2
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	8	5	3
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	4	1

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 Education India

SUBJECT NAME: PRINCIPLES OF MARKETING

SUBJECT CODE: BCA24-DSE-303

Credit: 3

CONTACT HOURS : 40 (2L + 1T)

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

MOD ULE NO.	COURSE CONTENT	Hours	L	T
1	Introduction to Marketing (8L) 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	8	6	2
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	6	2

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	6	2
4	Sales Promotion Programme and Advertisement (8L) Sales Promotion Programme Advertising Personal Selling Decision and Publicity International Marketing	8	6	2
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	8	6	2

Suggested Readings:

1. Kotler, Armstrong, Agnihotri and Haque, (2010), Principles of Marketing- A South Asian Perspective, 13th edition, Pearson Education.
2. Ramaswamy and Namkumar, S., (2009), Marketing Management Global Perspective: Indian Context, McMillan, Delhi.
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 : 40 (2L + 1T)

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

MOD ULE NO.	COURSE CONTENT	Hours	L	T
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	6	2

2	The Union: Executive, Legislative and Judiciary (6L) 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	6	4	2
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	4	2	2
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	4	2	2
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.	8	6	2

	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.			
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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	P
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	P
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: 30 (4P)

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	HOURS	P
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	6	6
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.	6	6
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.	6	6

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	3	3
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.	6	6
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	3	3

SUGGESTED READING:

1. " Cyber Crime and Its Prevention in Easy Steps " by Debturu 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: 40 (2 L + 1 T)

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	L	T
M1	Introduction: Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Data Abstraction, Three Schema architecture of DBMS.	2	2	0
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	8	6	2

	diagram, Subclass, Generalization, Specialization, Aggregation, 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	4	2
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.	8	6	2
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.	8	6	2
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	6	2

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 L (2 L + 1 T)

CONTACT HOURS: 40

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	L	T
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	4	3	1

	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			
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	14	11	3
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	6	2
M4	File management: File naming, File structures, File Types, Single Level and Hierarchical OS, Shared file, Disk management and Disk scheduling strategies	4	3	1
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	4	2
M6	Distributed Operating System: Goal of Distributed OS, Remote Procedure call, Name resolution, Clock Synchronization,	4	3	1

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: 40 (2L+1T)

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	L	T
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	4	1
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	5	3	2

	objects, Defining Operations), 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)	12	9	3
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)	8	6	2
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, Metrics, Six Sigma for Software Engineering	5	4	1
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	4	1

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 (2L+1T)

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	L	T
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..	8	6	2
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	4	2
M3	Job Analysis: Concept, Uses, Job Description, Job Specification, Methods of collecting Job Analysis Data, Job Evaluation.	8	6	2
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	7	5	2

	Education, Different Methods of Training, Training needs assessment – KIRK-PATRICK, CIPO, CIRO, Training calendar.			
M5	HRD: Definition, objective, process of HRD, Assessment of HRD Needs, HRD Methods	5	4	1
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	5	1

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: 40 (2 L + 1 T)

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	L	T
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	3	1
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	10	8	2
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.	4	3	1

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.	10	8	2
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	6	2
M6	E-core values: ethical issues, legal issues, taxation issues and international issues.	4	3	1

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: 30 (2 L)

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	L
M1	Demographic Profile: Characteristics of Indian Population, Population Growth, Age, Sex, Religion, Language, Occupations, National Policy on Population	6	6
M2	Indian Society and culture: Society and its types, Culture – Features, Characteristics and Diversity. Differences with Western Culture,	6	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.	6	6
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.	6	6
M5	Introduction to Human Behaviour: Overview of human behaviour, Importance of studying human behaviour, determinants of human behavior	6	6

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.