BCA

PROGRAM EDUCATIONAL OBJECTIVES

1. To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors
2. Provide strong foundations in fundamental ions of computer science and applications for employability and/or further graduation.
3. Empower students with competencies in creative thinking and problem solving, interpersonal communication and managerial skills.
4. Facilitate over all understanding of the technological development with legal and ethical issues.
5. Equip the students in providing professional solutions to real-time problems.
6. To develop entrepreneurs
7. To develop ethical managers with inter disciplinary knowledge.
8. To develop IT enabled global middle level managers for solving real life business problems and addressing business development issues with a passion for quality, competency and holistic approach
9. To prepare students to take up higher education to become business scientists, researchers, consultants and teachers, with core competencies

PROGRAM OUTCOMES (PO):

1. The objective behind BCA is to equip students with the latest technology, tools and applications in IT and to meet the ever-growing requirement of IT professionals
2. Apply technical and professional skills to excel in business
3. Communicate effectively in both verbal and written form
4. Develop practical skills to provide solutions to industry, society and business using latest technologies, tools and applications.
5. Ability to go for higher education like MCA or MBA.

BANGALORE UNIVERSITY

Department of Computer Science and Applications

Draft for BCA Course Structure

BCA (with specialization in AI & ML/ Data Science/ Full Stack Development)

AS PER STATE EDUCATION POLICY

Sem	Course/ Paper Code	Title of the Paper	Teaching Hours / week	Semester End Exam	Internal Assessment	Total Marks	Credits
1	24BCA11	Discrete Structure	03	80	20	100	3
	24BCA12	Problem Solving Technique	03	80	20	100	3
	24BCA13	Computer Architecture	03	80	20	100	3
	24BCA12P	Problem Solving Technique Lab	04	40	10	50	2
	24BCA13P	Computer Architecture Lab	04	40	10	50	2
	24BCA1P	Office Automation Tools	04	40	10	50	2
	24BCAL11	Language L1	04	80	20	100	3
	24BCAL12	Language L2	04	80	20	100	3
	24BCACC1	Environmental Studies	02	40	10	50	2
2	24BCA21	Data Structure	03	80	20	100	3
	24BCA22	Object Oriented Programming Using JAVA	03	80	20	100	3
	24BCA23	Operating Systems	05	80	20	100	5
	24BCA21P	Data Structure Lab	04	40	10	50	2
	24BCA22P	Operating Systems Lab	04	40	10	50	2
	24BCA21P	LINUX and Shell Programming Lab	04	40	10	50	2
	24BCAL21	Language L1	04	80	20	100	3
	24BCAL22	Language L2	04	80	20	100	3
	24BCASEC1	Computer Applications	04	40	10	50	2

Sem	Course/ Paper Code	Title of the Paper	Teaching Hours / week	Semester End Exam	Internal Assessment	Total Marks	Credits
3	24BCA31	Database Management System	03	80	20	100	3
	24BCA32	Probability and Statistics	03	80	20	100	3
	24BCA33	Artificial Intelligence	04	80	20	100	4
	24BCA31P	Database Management System Lab	04	40	10	50	2
	24BCA32P	Artificial Intelligence Lab using Python	04	40	10	50	2
	24BCAE1	Elective: I Feature Engineering (AI &ML) Basics of Data Analytics using Spreadsheet (Data Science) Web Programming-I (Full Stack Development)	02	40	10	50	2
	24BCAL31	Language L1	04	80	20	100	3
	24BCAL32	Language L2	04	80	20	100	3
	24BCACC2	The Constitution of India	02	40	10	50	2
4	24BCA41	Computer Networks	03	80	20	100	3
	24BCA42	Design and Analysis of Algorithms	03	80	20	100	3
	24BCA43	Software Engineering	04	80	20	100	4
	24BCA41P	Computer Networks Lab	04	40	10	50	2
	24BCA42P	Design and Analysis of Algorithms Lab	04	40	10	50	2
	24BCAE2	Elective: II Introduction to ML(AI &ML) Data Visualization (Data Science) Web Programming-II (Full Stack Development)	02	40	10	50	2
	24BCAL41	Language L1	04	80	20	100	3
	24BCAL42	Language L2	04	80	20	100	3
	24BCASEC2	Computer Assembly and Repair Lab	04	40	10	50	2

Sem	Course/ Paper Code	Title of the Paper	Teaching Hours / week	Semester End Exam	Internal Assessment	Total Marks	Credits
Semester – V(AI & ML)							
5	24BCA51	ML & Neural Network	03	80	20	100	3
	24BCA52	Digital Image Processing	03	80	20	100	3
	24BCA53	Natural Language Processing	05	80	20	100	5
	24BCA51P	ML & Neural Network Lab	04	40	10	50	2
	24BCA52P	Digital Image Processing Lab	04	40	10	50	2
	24BCASEC2	Quantitative Techniques	02	40	10	50	2
Semester – VI (AI & ML)							
6	24BCA61	Deep Learning for Computer Vision	04	80	20	100	5
	24BCA62	Predictive Analysis	04	80	20	100	5
	24BCA63	Project Work	10	80	20	100	5
	24BCASEC3	Soft Skills	02	40	10	50	2
Semester – V (Data Science)							
5	24BCA51	Introduction to Data Science	03	80	20	100	3
	24BCA52	Time Series Analysis	03	80	20	100	3
	24BCA53	Machine Learning	03	80	20	100	3
	24BCA51P	Data Science Lab	04	40	10	50	2
	24BCA52P	Time Series Analysis Lab	04	40	10	50	2
	24BCA53P	Machine Learning Lab	04	40	10	50	2
	24BCASEC2	Quantitative Techniques	02	40	10	50	2
Semester – VI (Data Science)							
6	24BCA61	Big Data Analytics	05	80	20	100	5
	24BCA62	Exploratory Data Analysis	05	80	20	100	5
	24BCA63	Project Work	10	80	20	100	5
	24BCASEC3	Soft Skills	02	40	10	50	2

I SEMESTER

PROBLEM SOLVING TECHNIQUES USING C & LAB

Course Objectives:

1. To gain experience about structured programming. To help students to understand the implementation of C language. To understand various features in C.
2. To make the students to understand practically about the control structures and function.
3. To give the knowledge about collection of elements, character such as arrays, strings.
4. To make the students to gain the knowledge about Structure and pointers.
5. To give the information about files and its operation. About the c pre-processor directives.

Course outcomes:

1. Achieve Knowledge of design and development of C problem solving skills.
2. Understand the basic principles of Programming in C language.
3. Design and develop modular programming skills.
4. Effective utilization of memory using pointer technology.
5. Understands the basic concepts of pointers and data structures.

COMPUTER ARCHITECTURE

Course Objectives:

1. Introduce students to the digital circuits and functions.
2. Discussions will include digital logic and microprogramming.
3. To make students to solve the problems related to data representation and data transfers.
4. To study the basic organization and architecture of digital computers 10.To study the working and internal structure of CPU Organization.
5. To study the working and internal structure of memory, I/O Organization

Course Outcomes

1. Analyze fundamental issues in architectural design and their impact on performance.
2. Understand parallelism both in terms of a single & multiple processors
3. Evaluate the behavior of existing and emerging hardware architecture and improve the performance of application on modern & high-performance computer.
4. Compare the performance of different architecture and analyze the operation of performance enhancement through various techniques

II SEMESTER

DATA STRUCTURES & LAB

Course Objective:

1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implement of various basic and advanced data structures.
3. To introduce various techniques for the representation of the data in the real world.
4. To develop application using data structures.
5. To teach the concept of protection and management of data.
6. To improve the logical ability.

Course outcomes:

1. Acquire knowledge of
    i. Various types of data structures, operations, and algorithms.
    ii. Sorting and searching operations.
    iii. File structures.
2. Analyze the performance of
    i. Stack, Queue, Lists, Trees, Graphs, and Searching and Sorting techniques.
3. Implement all the applications of Data structures in a high-level language.
4. Design and apply appropriate data structures for solving computing problems.

OBJECT ORIENTED PROGRAMMING USING JAVA & LAB

Course objective:

1. To gain knowledge about java language syntax and semantics to write java program
2. To understand the fundamentals of oops in java, including classes, methods and objects
3. To understand the principles of inheritance, packages and interface
4. To understand the concept of vectors , string and exception handling
5. To gain knowledge about java applets
6. Creating GUI applications using Applets
7. Read and write data using java streams

Course Outcomes

1. Understand JAVA , Object Oriented concepts for implementing classes and its specification.
2. Understand and implementation of multi threads and event handling in JAVA.
3. Understand GUI components of JAVA
4. Understand and analyze JAVA collection API using Applet

OPERATING SYSTEM

Course Objective:

1. Demonstrate the need for OS and different types of OS
2. Apply suitable techniques for management of different resources
3. Use processor, memory, storage and file system commands
4. Realize the different concepts of OS in platform of usage through case studies

Course outcomes:

1. Identify the structure of an operating system and its scheduling mechanism.
2. Demonstrate the allocation of resources for a process using scheduling algorithm.
3. Identify root causes of deadlock and provide the solution for deadlock elimination

III SEMESTER

DATA BASE MANAGEMENT SYSTEMS & LAB

Course Objective:

1. To understand the different issues involved in the design and implementation of a database system
2. To study the physical and logical database designs, database modeling, relational, hierarchical and network models.
3. To understand and use data manipulation language to query, update and manage a database. To develop an understanding of essential DBMS concepts such as: database security, integrity, and concurrency.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course outcomes:

1. Master the basic concepts and appreciate the applications of database systems.
2. Mater sound design principles for logical design of databases, including the E-R method and and no normalization approach.
3. Be familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.
4. Be familiar with the basic issues of transaction processing and concurrency control.
5. Master working successfully on a team by design and development of a database application system as part of a team.
6. To know the concept of Normalization and have the ability to present and discuss issues regarding emerging database technologies.

Artificial Intelligence

Course Outcomes:

1: Understand the characteristics of rational agents, and the environment in which they operate, and gain insights about problem-solving agents.
2: Gain insights about Uninformed and Heuristic search techniques and apply them to solve search applications.
3: Appreciate the concepts of knowledge representation using Propositional logic and Predicate calculus and apply them for inference/reasoning.
4: Obtain insights about Planning and handling uncertainty through probabilistic reasoning and fuzzy sets.
5: Obtain a basic understanding of the AI domains and their applications and examine the legal and ethical issues of AI.

IV SEMESTER

COMPUTER NETWORK & LAB

Course Objective:

1. Enables an understanding of the importance of data communication and the internet in supporting business communications and daily activities.
2. Helps understand the role of protocols in networking and analyze the features and operations of various application layer protocols such as Http, DNS and SMTP
3. Enables students to analyze the services and features of the various layers of data network.
4. Helps design, calculate, and apply subnet mask and address to fulfill networking requirements.

Course outcome:

1. Learn the basic needs of communication system.
2. Interpret the communication challenges and its solution.
3. Identify and organize the communication system network components
4. Design communication networks for user requirements.

SOFTWARE ENGINEERING

Course Objectives:

1. To learn software models like water fall model, iterative model, incremental model, etc.,
2. To gain knowledge how to collect and analyze user requirements.
3. To learn how to translate end user requirements into system.
4. To learn how to structure these in a software Requirements Document(SRD)
5. To learn about some validation and verification like black box and white testing.

Course Outcomes:

1. Categorize problems based on their characteristics and practical importance.
2. Develop Algorithms using iterative/recursive approach
3. Compute the efficiency of algorithms in terms of asymptotic notations
4. Design algorithm using an appropriate design paradigm for solving a given problem
5. Classify problems as P, NP or NP Complete
6. Implement algorithms using various design strategies and determine their order of growth.

DESIGN AND ANALYSIS OF ALGORITHMS & LAB

Course Objectives:

1. Explain the methods of analyzing the algorithms and to analyze performance of algorithms.
2. State algorithm's efficiencies using asymptotic notations.
3. Solve problems using algorithm design methods such as the brute force method, greedy method, divide and conquer, decrease and conquer, transform and conquer, dynamic programming, backtracking and branch and bound.
4. Choose the appropriate data structure and algorithm design method for a specified application.
5. Introduce P and NP classes.

Course outcome:

1. Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.
2. Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same
3. Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.
4. Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.
5. Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.