

KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH UNIVERSITY
BHUJ.

Year: 2024-2025



Bachelor in Computer Application (BCA)

(With Research /Without Research)

Semesters : III and IV
(Exit option)

FACULTY OF SCIENCE

SYLLABUS

Curriculum as per UGC Guideline
Framed according to National Education Policy (NEP) - 2020
With effect from June – 2024 (and thereafter)



BCA – Semester 3 Course Outline with Subject Titles

Semester	Course No.	Course Type	Name of the Subject	Selection	Credits
3	301 (Major)	BCADSC301 BCADSC301-P	Understanding OOP with Python Lab: OOP with Python	Compulsory	2 2
	302 (Major)	BCADSC302 BCADSC302-P	Data structures using C Lab: Data structures using C		2 2
	303 (Major)	BCADSC303 BCADSC303 P	DBMS – I Lab: DBMS – I		2 2
	301 A 301 B (MDC)	BCAMD301A BCAMD301B	Computer Based Numerical Techniques Cyber Security		Select Any One
	AEC		Courses will be taken from Arts and Commerce Basket		
	VAC				
	301	BCASE301	An Introduction to AI		2



BCA - Semester: III

Course Code:	BCADSC301	Course Title:	Understanding OOP with Python
Course Credits:	02	Hour of Teaching/Week:	2 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1Hr		

Unit	Contents
1	Basics of OOP- What is OOP? POP vs OOP, Principles of OOP Object Oriented Python, Modules vs Classes & Objects. Installing & Understanding PyCharm IDE OOP in Python: Class Bundles, Creation and Instantiation, Instance Methods, Encapsulation, Init Constructor, Class Attributes, Working with Class and Instance Data
2.	Default Arguments, Inheritance, Inheriting Attributes, Polymorphism, Overriding, ,Multiple Inheritance and the Lookup Tree, Decorators, Static and Class Methods, File I/O



BCA - Semester: III

Course Code:	BCADSC301 P	Course Title:	Understanding OOP with Python
Course Credits:	02	Hour of Teaching/Week:	4 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	2 Hr		

Practical based on Following Topics	
1	<ul style="list-style-type: none">• PyCharm IDE• Python Scripts with classes• Scripts to understand Instance Methods• Scripts showing use of Init Constructor• Scripts with Constructors• Scripts to demonstrate use of Class Attributes• Scripts to demonstrate concept of encapsulation.
2	<ul style="list-style-type: none">• Scripts using Default arguments• Scripts to demonstrate concept of Inheritance• Scripts to demonstrate concept of Polymorphism• Scripts to demonstrate concept Overriding• Scripts to demonstrate concept of Inheriting constructors• Scripts to demonstrate concept of Multiple Inheritance• Scripts to demonstrate concept of decorators in Python• Scripts to demonstrate concept of Static Methods• Scripts to demonstrate concept of Class Methods



BCA - Semester: III

Course Code:	BCADSC302	Course Title:	Data Structures Using C
Course Credits:	02	Hour of Teaching/Week:	2 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1Hr		

Unit	Contents
1.	Introduction to Data Structures Overview of data organization and data types, Linked Lists, and Stacks, Queues and their implementations. Trees and Graphs Binary Trees and Binary Search Trees, Graph representation and traversal
2.	Hashing Introduction to hashing and its applications. Hash functions and collision resolution techniques. Hash tables and their implementation. Sorting and Searching Algorithms Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort, Linear and Binary Search.



BCA - Semester: III

Course Code:	BCADSC302 P	Course Title:	Data Structures Using C
Course Credits:	02	Hour of Teaching/Week:	4 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	2 Hrs		

Practical Based on Following Topics	
1.	<ul style="list-style-type: none">• C Program to implement the Linked Lists• C Program to implement Stacks• C Program to implement Queues• C Program to implement Trees• C Program to understand Graphs
2.	<ul style="list-style-type: none">• C Program to implement Hash functions• C Program to Understand collision resolution techniques.• C Program to Understand Hash tables• C Program to implement Bubble Sort• C Program to implement Selection Sort• C Program to implement Insertion Sort• C Program to implement Merge Sort,• C Program to implement Quick Sort• C Program to implement Heap Sort• C Program to implement Linear search• C Program to implement Binary Search.



BCA - Semester: III

Course Code:	BCADSC303	Course Title:	DBMS I
Course Credits:	02	Hour of Teaching/Week:	02
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1 Hr		

Unit	Contents
1.	<p>Introduction</p> <p>Definition of DBMS</p> <p>File processing system Vs DBMS</p> <ul style="list-style-type: none"> - Limitation of file processing system - Comparison of File processing system and DBMS <p>Advantages and Disadvantages of DBMS</p> <p>Entity Relationship Diagram (ERD)</p> <p>Relational Databases</p> <p>Introduction, Terms, - Relation, Tuple, Attribute, Cardinality, Degree, Domain</p> <p>Keys, - Super Key, Candidate Key, Primary Key, Foreign Key</p>
2.	<p>Introduction to SQL</p> <ul style="list-style-type: none"> -SQL Commands and Data types -Operators and Expressions -Creating and Altering tables (Including constraints) -Data Manipulation Command like Insert, update, delete -SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, ---Special operator like IN, ANY, ALL, BETWEEN, EXISTS, LIKE -Joins, -subquery -Built – In Function of SQL



BCA - Semester: III

Course Code:	BCADSC303 P	Course Title:	Lab: DBMS I
Course Credits:	02	Hour of Teaching/Week:	02
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1 Hr		

Unit	Contents
1.	<ul style="list-style-type: none">● Understanding the Oracle IDE● Granting Permission using DCL Commands.● Creating and altering Database and tables using DDL Commands● Inserting and modifying data using DML Commands.● Working on transactions using TCL commands.● Enforcing Constraints (Primary Key, Foreign Key, Unique Key, NOT NULL, Check)● Accessing the data using SELECT command.● Using different clauses with the SELECT statement. (WHERE, HAVING, GROUP BY, ORDER BY, DISTINCT)● Using special operators like IN, ANY, ALL, BETWEEN, EXISTS, LIKE● Demonstrating the concept of Joins (INNER, LEFT, RIGHT, OUTER)● Demonstrating the concept of Subquery.



BCA Semester: III

Course Code:	BCAMD301A	Course Title:	Computer Based Numerical Techniques
Course Credits:	04	Hour of Teaching/Week:	04
Internal Assessment Marks:	50	External Exam Marks:	50
Exam Duration	2.30Hrs		

Unit	Contents
1.	Introduction to Numerical Techniques Overview of numerical methods and their applications, Errors in numerical computations and methods to reduce them
2.	Solving Equations Bisection method, Newton-Raphson method, Secant method, Root-finding techniques and convergence criteria.
3.	Interpolation and Approximation Interpolation methods: Lagrange interpolation, Newton's divided difference, Curve fitting techniques: Least squares approximation
4.	Numerical Integration and Differentiation Numerical integration methods: Trapezoidal rule, Simpson's rule, Numerical differentiation techniques.



BCA - Semester: III

Course Code:	BCAMD301B	Course Title:	Cyber Security
Course Credits:	04	Hour of Teaching/Week:	4 Hrs
Internal Assessment Marks:	50	External Exam Marks:	50
Exam Duration	2 Hrs		

Unit	Contents
1.	Fundamentals of Cyber Security and Threat Landscape Importance and challenges in Cyber Security, Cyberspace, and Cyber threats, Cyber warfare, CIA Triad, Cyber Terrorism, Cyber Security of Critical Infrastructure
2.	Cyber Attacks and Intrusion Techniques Types of Hackers - Hackers and Crackers, Cyber-Attacks and Vulnerabilities, Malware threats, Sniffing, Gaining Access - Escalating Privileges, Executing Applications, Hiding Files, Covering Tracks, Worms, Trojans, Viruses, Backdoors
3.	Ethical Hacking and Information Security Practices Ethical Hacking Concepts and Scopes, Threats and Attack Vectors, Information Assurance, Threat Modeling, Enterprise Information Security Architecture, Vulnerability Assessment and Penetration Testing
4.	Legal Framework and Countermeasures in Cyber Security IT Act, Hackers-Attacker-Countermeasures, Web Application Security, Counter Cyber Security Initiatives in India, Cyber Security Incident Handling, Cyber Security Assurance
	Reference Books: 1. Cyber Security and Cyber Laws Nilakshi Jain Wiley 2. Cyber Security Nina Godbole Wiley



BCA - Semester: III

Course Code:	BCASE-301	Course Title:	An Introduction to AI
Course Credits:	02	Hour of Teaching/Week:	02
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	2 Hrs		

Unit	Contents
1.	<p>Fundamentals of Artificial intelligence and Intelligent Agent</p> <p>What is AI? -Acting humanly: The Turing Test approach, - Thinking humanly: The cognitive modelling approach, - Thinking rationally: The “laws of thought” approach, - Acting rationally: The rational agent approach State of Art (Applications of AI)</p> <p>Agents and Environments The Concept of Rationality The Nature of Environment The Structure of Agents.</p>
2.	<p>Problem Solving by searching</p> <p>Problem-Solving Agents</p> <ul style="list-style-type: none"> -Well defined problem and solutions - Formulating problems Example Problems -Toy problems Searching for Solution Uninformed Search Strategies -Concept of BFS -Concept of DFS , -Depth-limited search -Iterative deepening DFS -Bidirectional search Informed (Heuristic) Search Strategies -Concept of Greedy BFS -A* search: Minimizing the total estimated solution cost <p>Case Study: Applications of AI in health care, education, marketing.</p>
	<p>TEXT BOOKS:</p> <p>1) Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig, Third Edition</p> <p>2) Machine Learning for Developers: Claudio Delrieux</p> <p>3) The Hundred-Page Machine Learning Book : Andriy Burkov</p> <p>REFERENCE BOOKS:</p> <p>1) Artificial Intelligence, 2nd Edition, Rich and Knight</p> <p>2) Machine Learning, Tom M Mitchell</p> <p>3) Artificial Intelligence: A New Synthesis, Nils J. Nilsson</p>



BCA – Semester 4 Course Outline with Subject Titles

Semester	Course No.	Course Type	Name of the Subject	Selection	Credits
4	401 (Major)	BCADSC401 BCADSC401-P	Advance OOP with JAVA Lab: Advance OOP with JAVA	Compulsory	2 2
	402 (Major)	BCADS4C402	Computer Network		4
	403 (Major)	BCADSC403 BCADSC403-P	DBMS – II Lab: SQL AND MYSQL		2 2
	401 A 401 B (Minor)	BCADSE401A BCADSE401B	System Analysis and Design Data Science		Select Any One
	AEC		Courses Can be Selected from arts and Commerce basket :		
	VAC				
	SEC	401 BCASE-401	Introduction to IOT		2



BCA - Semester: IV

Course Code:	BCADSC401	Course Title:	Advance OOP with JAVA
Course Credits:	02	Hour of Teaching/Week:	2 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1Hr		

Unit	Contents
1	<p>The Java Environment: Installing Java, Java Program Development , Java Source File Structure ,Compilation, Executions.</p> <p>Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments ,Primitive Datatypes, Operators Assignments.</p> <p>Object Oriented Programming Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The 'this' keyword, Overloading Methods, Using Objects as Parameters, Returning Objects, Recursion, Understanding 'static', Introducing 'final ', Using Command-Line Arguments, Varargs : Variable-Length Arguments</p> <p>Arrays and Strings: One dimensional arrays, Creating an arrays, Two dimensional arrays , Strings, Vectors, Wrapper classes.</p>
2.	<p>Exception Handling: The Idea behind Exception ,Exceptions & Errors ,Types of Exception ,Control Flow In Exceptions, JVM reaction to Exceptions ,Use of try, catch, finally, throw, throws in Exception Handling ,In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.</p> <p>Thread : Understanding Threads , Needs of Multi-Threaded Programming ,Thread Life-Cycle, Thread Priorities ,Synchronizing Threads, Inter Communication of Threads ,Critical Factor in Thread –D</p> <p>A Collection of Useful Classes Utility Methods for Arrays ,Observable and Observer Objects , Date & Times ,Using Scanner Regular Expression, Input/Output Operation in Java(java.io Package),Streams and the new I/O Capabilities ,Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects .</p>

Text Books :

1. E Balagurusamy, Programming with Java – A Primer, Fourth Edition, Tata McGraw Hill Education Private Limited.
2. Herbert Schildt, Java : The Complete Reference, Seventh Edition, McGraw Hill Publication.

Reference Books:

1. Herbert Schildt, Java 2 - The Complete Reference, Fifth Edition, McGraw Hill publication.
2. Cay S. Horstmann, Core Java Volume I –Fundamentals, Prentice Hall.
3. Somashekara, M.T., Guru, D.S., Manjunatha, K.S, Object Oriented Programming with Java, 2nd Edition, PHI.



BCA - Semester: IV

Course Code:	BCADSC401 P	Course Title:	Lab: Advance OOP with JAVA
Course Credits:	02	Hour of Teaching/Week:	4 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1 Hr		

Practical Based on Following Topics

	<ul style="list-style-type: none"> • Program to accept student name and marks in three subjects. Find the total marks, average and grade (depending on the average marks). • A menu driven program to input two integers & an operator to perform basic arithmetic operations (+, -, *, and /) using switch case structure. • Program, which reads two numbers having same number of digits. The program outputs the sum of product of corresponding digits. (Hint Input 327 and 539 output $3 \times 5 + 2 \times 3 + 7 \times 9 = 84$) • Program to input Start and End limits and print all Fibonacci numbers between the ranges. (Use for loop) • Define a class named Pay with data members String name, double salary, double da, double hra, double pf, double grossSal, double netSal and methods: Pay(String n, double s) - Parameterized constructor to initialize the data members, void calculate() - to calculate the following salary components, and void display() - to display the employee name, salary and all salary components. <ul style="list-style-type: none"> ➤ Dearness Allowance = 15% of salary House Rent Allowance = 10% of salary ➤ Provident Fund = 12% of salary Gross Salary = Salary + Dearness Allowance + House Rent Allowance ➤ Net Salary = Gross Salary - Provident Fund • Write a main method to create object of the class and call the methods to compute and display the salary details. • Program to create a class DISTANCE with the data members feet and inches. Use a constructor to read the data and a member function Sum () to add two distances by using objects as method arguments and show the result. (Input and output of inches should be less than 12.) • Program to check whether the given array is Mirror Inverse or not. • Program to create a class "Matrix" that would contain integer values having varied numbers of columns for each row. Print row-wise sum. • Program to extract portion of character string and print extracted string. Assume that 'n' characters extracted starting from mth character position. Program to add, remove and display elements of a Vector.
2.	<ul style="list-style-type: none"> • Create an abstract class and try to use it. Enlist the problems that come. Create an abstract class inherit it and implement the methods of the abstract class, e.g. People – Student.



- Create an inner class shape which has a method called pyramids to create a pyramid scheme. Use this method in the outer class.
- Write a program to handle an exception using try and catch block (Zero division problem)
- Define an exception "Not Found" that is thrown when a string is not equal to "India" write a program that uses this exception.
- Write a program, which displays the use of finally. Explain how it is different or similar to catch.



BCA - Semester: IV

Course Code:	BCADSC402	Course Title:	Computer Network
Course Credits:	04	Hour of Teaching/Week:	4 Hrs
Internal Assessment Marks:	50	External Exam Marks:	50
Exam Duration	2Hrs		

Unit	Contents
1.	<p>Introduction to Data Communication & Networks Components of a data communication system, Types of networks, Network topologies and communication protocols.</p> <p>Fundamentals of data communications- Signal representation, digital and analog signals, modems, data codes, Unicode.</p> <p>Conducted media-Twisted pair, coaxial and fiber-optic cable, Radiated media- broadcast radio, microwave, cellular radio, SS radio,</p> <p>Multiplexers- FDM, TDM, STDM, WDM, FDMA, TDMA, CDMA</p>
2.	<p>Analog modulation- AM, FM, PM, QAM, Digital modulation- digital to analog, analog to digital and digital to digital modulation, Transmission directions-simplex, half-duplex, full-duplex, Modes- serial, parallel, Synchronization- asynchronous,synchronous, Errors- detection, correction, prevention,</p>
3.	<p>Switched circuits- DEMARC, LEC, VPN, ISDN, Dedicated circuits- voice grade, wideband, T-carrier, DSL, SONET, Fast packet services- X.25, Frame relay, ATM, SMDS, AIN, MPLS. Physical security, Software security, Digital signatures, Security issues.</p>
4.	<p>Network Security and Wireless Networks Network security concepts: encryption, firewalls, VPN, Wireless networks and technologies.</p> <p>Network Management and Emerging Technologies Network management and monitoring tools, Cloud computing and virtualization.</p>

Text Books :

1. Business Data Communications: Shelly / Cashman / Serwatka (Thomson Publishers)
2. Data Communication and Networking : Dr. M. Jain, Satish Jain (BPB)
3. "Computer Networking: A Top-Down Approach" by James F. Kurose and Keith W. Ross



BCA - Semester: IV

Course Code:	BCADSC403T	Course Title:	DBMS II
Course Credits:	02	Hour of Teaching/Week:	2 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1 Hr		

Unit	Contents
1.	<p>SQL (Structured Query Language)</p> <p>Introduction, History of SQL, Basic Structure DDL, Commands DML Commands, Simple Queries, Nested Queries, Aggregate Functions</p> <p>Introduction to Procedural SQL Introduction</p> <p>Advanced Data Types, Conditional Statements, Looping Statements, Exceptional Handling.</p> <p>Overview of Function and Procedure, Function and Procedure Usage, Creation of Stored Procedure, Calling Stored Programs from Stored Programs, Creation of User Defined Function, Calling Function from Stored Programs</p>
2.	<p>Overview of Function and Procedure, Function and Procedure Usage, Creation of Stored Procedure, Calling Stored Programs from Stored Programs, Creation of User Defined Function, Calling Function from Stored Programs</p> <p>Cursor</p> <p>Working with Cursor Overview of Cursor, Types of Cursor, Cursor Declaration, Cursors : OPEN CLOSE and FETCH, Advantages and Disadvantages of Cursor</p> <p>Triggers</p> <p>Triggers and Their Features, Types of Triggers, Trigger Events, Trigger Creation, Implementation of BEFORE and AFTER Trigger, Error Handling in Trigger, Restriction on Trigger</p>

Basic Text & Reference Books :-

1. Silberschatz, Korth, Sudarshan, "Database System Concepts", 5th Edition, McGraw Hill Publication
2. Silberschatz, Korth, Sudarshan, "Database System Concepts", 5th Edition, McGraw Hill Publication.



BCA - Semester: IV

Course Code:	BCADSC403P	Course Title:	Lab: SQL and MySQL
Course Credits:	02	Hour of Teaching/Week:	2 Hrs
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1 Hr		

Practical Based on Following Topics	
1	<ul style="list-style-type: none">• Implement SQL queries to perform various DDL Commands. (Create minimum 5 tables with different datatypes and operation).• Implement SQL queries to perform various DML Commands. (Insert minimum 10 rows using different insert methods, edit and remove data using update and delete commands). Retrieve data using SELECT command and various SQL operators.• Executing Data Conversion functions such as To_char(), To_Number() and To_date(). Execute various Date functions and also display special date formats using To_char() function.• Executing Queries using the Select Command with Where, Having ,Group by and order by clauses also execute the queries using aggregate functions
2.	<ul style="list-style-type: none">• Write the basic PL/SQL Programs and also Write a PL/SQL programs using if then else, for, while and nested loop.• Write a PL/SQL code to implement implicit and explicit cursors.• Write PL/SQL Programs based on Exceptions handling. (Predefined and user-defined exceptions)• Write PL/SQL code for creating Procedures, functions and database triggers



BCA - Semester: IV

Course Code:	BCADSE401A	Course Title:	System Analysis And Design
Course Credits:	04	Hour of Teaching/Week:	04
Internal Assessment Marks:	50	External Exam Marks:	50
Exam Duration	2Hrs		

Unit	Contents
1.	<p>INTRODUCTION TO SYSTEM ANALYSES AND DESIGN Business Process Modeling, Information System Components, Types of Business Information Systems, Organizational Structure, System Development Techniques and Tools, Overview of Systems development Methodologies, The System Development Life Cycle, Information Technology Department, The System Analyst Position. PRELIMINARY INVESTIGATION The importance of strategic planning, A framework for system development, Information System Projects, Evaluation of system requests, Preliminary investigation overview, Steps in preliminary investigation</p>
2.	<p>REQUIREMENTS MODELING System analysis phase overview, System development methods, Modeling tools and techniques, system requirements checklist, Scalability and total cost of ownership, Fact finding, Interviews, Other fact finding techniques, Documentation, Preview of data, Process and object modeling DATA AND PROCESS MODELING Data flow diagrams, Data dictionary, Process Description tools, Logical vs. physical models OBJECT MODELING Object oriented terms and concepts, Relationships among objects and classes, Object modeling with the unified modeling language</p>
3.	<p>TRANSITION TO SYSTEM DESIGN Evaluating software alternatives, Steps in evaluating and purchasing software packages, Completion of system analysis, Transition to system design, Prototyping, Overview of system design, Designing and using codes User interface design, Input design, Output design issues, Printed output- Select, Project, Union, Difference, Intersection, Cartesian, Product, Natural Join</p>
4.	<p>APPLICATION DEVELOPMENT Quality assurance, Overview of application development, Structured application development, Other application development tools, Coding, Object-oriented application development, Testing the application, Documentation, Management approval</p>

Basic Text & Reference Books :-

1. System Analyses And Design, 4th Edition, By Shelly/Cashman/Rosenblatt (Thomson)
2. System Analyses and Design, 3rd Edition, By Elias Awad (Galgotia Publications)



BCA Semester: IV

Course Code:	BCADSE401B	Course Title:	Data Science
Course Credits:	04	Hour of Teaching/Week:	04
Internal Assessment Marks:	50	External Exam Marks:	50
Exam Duration	2 Hrs		

Unit	Contents
1.	<p>Introduction to Business Analytics</p> <p>Why Analytics Business Analytics: The Science of Data-Driven Decision Making Descriptive Analytics Predictive Analytics Prescriptive Analytics Descriptive, Predictive and Prescriptive Analytics Techniques Big Data Analytics</p>
2.	<p>Web and Social Media Analytics Machine Learning</p> <p>Algorithms Framework for Data-Driven Decision Making Analytics Capability Building Roadmap for Analytics Capability Building Challenges in Data-Driven Decision Making and Future</p>
3.	<p>An Introduction to Big Data Challenges, Managing varieties of Data, The Emerging Big Data Stack, Gartner hype cycle for Big Data emerging technologies, Big Data life Cycle, Types of Data (Unstructured, Structured, semi-structured) Opportunities in Big Data.</p> <p>Introduction to NoSQL: Difference between RDBMS and NoSQL, CAP Theorem for NoSQL, Features / Advantages of NoSQL, Types of NoSQL (Document, Key-Value, Columnar, Graph)</p>
4.	<p>Apache Hadoop Introduction, Hadoop eco-System, High Level Architecture: Component Level Architecture: MapReduce with Yarn, HDFS/ HDFS2, introduction to Yarn, Features of Yarn , Intro to Tez, Features of Tez, Introduction and Features : Pig, Hive, Hbase. Distributed publish-subscribe Messaging: Apache Kafka Distributed MapReduce: Introduction to Apache Spark</p>



BCA Semester: IV

Course Code:	BCASE401	Course Title:	Introduction to IOT
Course Credits:	02	Hour of Teaching/Week:	02
Internal Assessment Marks:	25	External Exam Marks:	25
Exam Duration	1Hrs		

Unit	Contents
1.	<p>Introduction to IOT</p> <ul style="list-style-type: none"> ● Understanding IoT fundamentals ● IOT Architecture. ● Various Platforms for IoT ● Real time Examples of IoT ● Overview of IoT components and IoT Communication Technologies ● Challenges in IOT <p>Arduino Simulation Environment</p> <ul style="list-style-type: none"> ● Arduino Uno Architecture ● Setup the IDE, Writing Arduino Software ● Arduino Libraries ● Basics of Embedded C programming for Arduino ● Interfacing LED, push button and buzzer with Arduino ● Interfacing Arduino with LCD
2.	<p>Sensor & Actuators with Arduino</p> <ul style="list-style-type: none"> ● Overview of Sensors working ● Analog and Digital Sensors ● Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino ● Interfacing of Actuators with Arduino. ● Interfacing of Relay Switch and Servo Motor with Arduino <p>PROJECT (STUDENT HAVE TO SUBMIT MINI PROJECT ON ABOVE TECHNOLOGY IN GROUP OF 3 STUDENTS DURING FINAL EXAM WITH PRESENTATION/VIVA)</p>



