

School of Computer Science
Bachelor of Computer Application (BCA)
Syllabus for three/four years Honours with Multiple Entry and Exit Options

Sr. No.	Subject Code	Subject Name	Paper Type	Credit	
				Theory	Practical
Semester-1					
1	BCAMA-101	Fundamental of Programming using C language	Major (Core)	4	
2	BCAMA-102	Fundamental of Computer & Information Technology	Major (Core)	4	
3	BCAMI-103	Introduction to Internet Technologies and HTML	Minor	4	
4	BCAMU-104	Financial Accounting and Management	Multidisciplinary	4	
5	BCAAE-105	Communication Skills-I	AEC	2	
6	BCASE-106	Practical Based on BCAMA-101 & BCAMI-103	SEC		2
7	BCAVA-107	Environmental Studies-I	VAC	2	
				20	2
Semester-2					
1	BCAMA-201	Operating System and Software Installation	Major (Core)	4	
2	BCAMA-202	Data Structure Using C	Major (Core)	4	
3	BCAMI-203	Database Management System (DBMS)	Minor	4	
4	BCAIN-204	Digital Electronics and Computer Organization	Interdisciplinary	4	
5	BCAAE-205	Communication Skills-II	AEC	2	
6	BCASE-206	Practical Based on BCAMA-202 & BCAMI-203	SEC		2
7	BCAVA-207	Environmental Studies-II	VAC	2	
				20	2
Semester-3					
1	BCAMA-301	Object Oriented Concepts & Programming - I	Major (Core)	4	
2	BCAMA-302	Introduction to Computer Network	Major (Core)	4	
3	BCAMA-303	Relational Database Management System	Major (Core)	4	
4	BCAIN-304	Cyber Security	Interdisciplinary	4	
5	BCAAE-305	Digital Marketing and SEO	AEC	2	
6	BCASE-306	Practical Based on BCAMA-301 and BCAMA-303	SEC		2
7	BCAVA-307	Personality Development-I	VAC	2	
				20	2
Semester-4					
1	BCAMA-401	Object Oriented Concepts & Programming-II (Advance Java)	Major (Core)	4	

2	BCAMA-402	System Analysis and Design	Major (Core)	4	
3	BCAMA-403	Web Technology using FOSS (LAMP / WAMP)	Major (Core)	4	
4	BCAMI-404	System Programming and Introduction to Microprocessor	Minor	4	
5	BCAAE-405	Basics of French Language	AEC	2	
6	BCASE-406	Practical Based on BCAMA-401	SEC		2
7	BCAVA-407	Personality Development-II	VAC	2	
				20	2
Semester-5					
1	BCAMA-501	Software Engineering	Major (Core)	4	
2	BCAMA-502	Client/Server Architecture and Interface (C#)	Major (Core)	4	
3	BCAMA-503	Introduction to Python Programming	Major (Core)	4	
4	BCAMI-504	Business Application and Introduction to ERP	Minor	4	
5	BCAMI-505	Mobile Operating Systems	Minor	4	
6	BCASE-506	Practical Based on BCAMA-502 & BCAMA-503	SEC		2
				20	2
Semester-6					
1	BCAMA-601	Object Oriented Analysis and Design with UML	Major (Core)	4	
2	BCAMA-602	Internet Programming (ASP.NET Using C#)	Major (Core)	4	
3	BCAMA-603	Mobile Application Development	Major (Core)	4	
4	BCAMI-604	E-Commerce	Minor (Elective)	4	
5	BCAMI-604	Data Warehousing and Data Mining	Minor (Elective)	4	
6	BCAAE-605	Software Testing	AEC	2	
7	BCASE-606	Minor Project Cum Internship Based on BCAMA-602 and BCAMA-603	SEC		4
				18	4
Semester-7					
1	BCAMA-701	Internet of Things	Major (Core)	4	
2	BCAMA-702	Cyber Security Tools Techniques and Counter Measures	Major (Core)	4	
3	BCAMA-703	Advanced Python Programming	Major (Core)	4	
4	BCAMI-704	SWAYAM-I (Elective)	Minor (Elective)	4	
5	BCAOJT-704	Software Development Project - I	OJT		6
				16	6
Semester-8					
1	BCAMA-801	Big Data Analytics	Major (Core)	4	
2	BCAMA-802	Fundamentals of Artificial Intelligence and Machine Learning	Major (Core)	4	
3	BCAMA-803	Cloud Infrastructure and Services	Major (Core)	4	
4	BCAMI-804	SWAYAM-II	Minor (Elective)	4	
5	BCAOJ-805	System Development Project - II	OJT		6
				16	6

Subject: BCAMA-101 Fundamental of Programming using C language

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Information to C Language• Keyword• Variable and Constants• Data Type• Operators
Block-2	<ul style="list-style-type: none">• Output, Input• Control statement• Loop• Nested control• Nested Loop
Block-3	<ul style="list-style-type: none">• Array• String• Multidimensional Array• Functions
Block-4	<ul style="list-style-type: none">• Structure• Pointer• File Management

Subject: BCAMA-102 Fundamental of Computer & Information Technology

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Overview of computers, Operating Systems, and Applications.• Overview of Windows 10 Operating System, File System, and Snipping Tool.
Block-2	<ul style="list-style-type: none">• Overview of Computer Networks, Internet, Browsers, and Cloud Computing.• Overview of Google Gmail, Contacts, Calendar, Google Drive, and OneDrive.
Block-3	<ul style="list-style-type: none">• Overview of Computer Security and Key System Utilities (Defender, Disk Cleanup, Defrag, Task Manager and Backup).
Block-4	<ul style="list-style-type: none">• Intro to Google Docs & OneDrive Word (Including File Format Converting).• Intro to Google Sheets and OneDrive Excel (Including File Format Converting).• Intro to Google Slides and OneDrive PowerPoint.

Subject: BCAMI-103 Introduction to Internet Technologies and HTML

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Fundamental of Internet, Intranet and Extranet• Internet Terminology• Web Server and Protocols• Recent Internet Technology Applications
Block-2	<ul style="list-style-type: none">• HTML Tags• Designing HTML Table• Designing HTML Forms• Designing HTML Frames
Block-3	<ul style="list-style-type: none">• Cascading Style Sheet• Attributes of Cascading Style Sheet• Effects of Cascading Style Sheet• Other Effects of Cascading Style Sheet
Block-4	<ul style="list-style-type: none">• Introduction to JavaScript• Functions and Dialog of JavaScript• Event , Method and Properties of JavaScript• Built In Function

Subject: BCAMU-104 Financial Accounting and Management

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Fundamentals of Accounting• Financial Statements
Block-2	<ul style="list-style-type: none">• Accounting Ratio• Cash Flow Statement
Block-3	<ul style="list-style-type: none">• Cost Concepts• Cost Sheet
Block-4	<ul style="list-style-type: none">• Budgetary Control• Marginal Costing• Capital• Working Capital

Subject: BCAAE-105 Communication Skills-I

Block	Detailed Syllabus
Block-1	The Seven Cs of Effective Communication: Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness Understanding Business Communication: Nature and Scope of Communication, Non-verbal Communication, Cross-cultural communication, Technology-enabled Business Communication
Block-2	Writing Business Messages and Documents: Business writing, Business Correspondence, Instructions Business Reports and Proposals, Career building and Resume writing. Developing Oral Communication Skills for Business: Effective Listening, Business Presentations and Public Speaking, Conversations, Interviews

Subject: BCAMA-201 Operating System and Software Installation

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Introduction to Operating System• Operating System Structure
Block-2	<ul style="list-style-type: none">• Processes• Threads• Process Scheduling• Process Synchronization and Deadlocks
Block-3	<ul style="list-style-type: none">• Memory Management• Page Replacement Algorithms
Block-4	<ul style="list-style-type: none">• File Systems Interface• File System Implementation• Mass Storage Structure• I/O Systems
Block-5	<ul style="list-style-type: none">• Protection• Security

Subject: BCAMA-202 Data Structure Using C

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Introduction to Data Structure• Algorithms
Block-2	<ul style="list-style-type: none">• Linked Lists• Stack• Queue
Block-3	<ul style="list-style-type: none">• Searching• Sorting
Block-4	<ul style="list-style-type: none">• Trees• Binary Search Tree• B-Tree• Graph

Subject: BCAMI-203 Database Management System (DBMS)

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Introduction to Database Systems• Database History• Data Modelling• Data Models
Block-2	<ul style="list-style-type: none">• Relational Data Model• Entity Relationship Model• Integrity Rules and Constraints.• Relational Design and Redundancy
Block-3	<ul style="list-style-type: none">• Functional Dependencies• Introduction to Data Normalization
Block-4	<ul style="list-style-type: none">• Introduction to SQL• SQL – Data Manipulation Language• SQL – Join Statements• Database Development Process

Subject: BCAIN-204 Digital Electronics and Computer Organization

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Boolean Algebra• Logic Gates• Simplification of Boolean Functions
Block-2	<ul style="list-style-type: none">• Combinational Switching Circuits• Logic Families

Block-3	<ul style="list-style-type: none"> • Flip-flops • Shift Registers • Counters
Block-4	<ul style="list-style-type: none"> • Digital to Analog Converters • Analog to Digital Converters • Digital Memories

Subject: BCAAE-205 Communication Skills-II

Block	Detailed Syllabus
Block-1	Developing Oral Communication Skills for Business: Meetings and Conferences, Group Discussions and Team Presentations, Team Briefing, Understanding Specific Communication Needs: Communication across Functional Areas
Block-2	Understanding Specific Communication Needs: Corporate Communication, Persuasive Strategies in Business Communication, and Ethics in Business Communication, Business Communication Aids Presentation Process: Planning the presentations, executing the presentations, Impressing the audience by performing, Planning stage: Brainstorming, mind maps / concept maps, executing stage: chunking theory, creating outlines, Use of templates. Adding graphics to your presentation: Visual communication, Impress stage: use of font, colour, layout, Importance of practice and performance.

Subject: BCAMA-301 Object Oriented Concepts & Programming – I

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none"> • Introduction to Object Oriented Programming • Elements of C++ Language • Operators and Manipulators • Decision and Control Structures
Block-2	<ul style="list-style-type: none"> • Array, Pointer and Structure • Functions • Introduction to Classes and Objects
Block-3	<ul style="list-style-type: none"> • Constructors and Destructors • Operator Overloading
Block-4	<ul style="list-style-type: none"> • Inheritance • Virtual Functions and Polymorphism • File Handling

Subject: BCAMA-302 Introduction to Computer Network

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Introduction to Networking, Components of Networking, Different Computing Models of Network• Intranets and Internets Network Services, FileServices, File Transfer Services, Printing Services, Application Services.• Fundamentals of communication theory
Block-2	<ul style="list-style-type: none">• Introduction to Standards, Standard Organization and the OSI rules and the Communication Process.• The OSI reference Model• IEEE802 family standard.
Block-3	<ul style="list-style-type: none">• Introduction to Transmission Media• Cable Media• Wireless Media• TCP/IP
Block-4	<ul style="list-style-type: none">• Connectivity Devices• Network architectures• Topologies.• Switching & Routing In Networks

Subject: BCAMA-303 Relational Database Management System (RDBMS)

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Basic Concepts: data, database, database systems, Database management system: Introduction, Purpose and advantages of Database management system (over file systems).• Architecture of DBMS: Architecture of DBMS, Various components of DBMS.• Data models: Introduction, Data modeling and mapping.• Tables (relations), rows (tuples), domains, columns (attributes), Database design process, Anomalies in a database.
Block-2	<ul style="list-style-type: none">• Functional Dependencies, Finding Candidate keys using Armstrong rules.• Stages of Normalization: 1NF, 2NF, 3NF, BCNF• ORACLE Server & Instances, Database Structure & Space Management, Memory & Process Structure, Schemas & Schema Objects, Client Server Architecture – Distributed Database Processing, Database Backup & Recovery, ORACLE Utility – Import , Export.

Block-3	<ul style="list-style-type: none"> • Basic Data Types of ORACLE, Data Definition Language (DDL), Data Manipulation Language (DML), Transaction Processing Language (TPL), Data Constraints, Inbuilt Functions, queries, Sub queries, Join, Indexes, Views, Sequences, and Synonyms. • ORACLE Database Object : Stored Procedures & Functions, • Packages, Triggers, Users – Create & Delete User, Grant & Revoke Command. • ORACLE Database Privileges & Roles: Privileges – System & Object Privileges, Assigning, Viewing, Revoking System & Object Privileges Roles – Create, Grant, View & Delete the Roles.
Block-4	<ul style="list-style-type: none"> • Introduction, Advantages of PL/SQL and Generic PL/SQL Block. • Cursor: Implicit & Explicit Cursor, Cursor For Loop, Parameterized Cursor. • Locking Strategy: Implicit & Explicit Locking, Lock Table. • Exception Handling: Predefine exceptions, Users define exceptions, Handling Raised exceptions.

Subject: BCAIN-304 Cyber Security

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none"> • Cyber Security Essentials • Attack Vectors, Threat, Risk and Vulnerability • Advance Persistent Threat and Cyber Kill Chain • Cyber Security Framework
Block-2	<ul style="list-style-type: none"> • Firewall and Packet Filters • Introduction to Windows and Linux Firewall • Attacks on Wireless Networks
Block-3	<ul style="list-style-type: none"> • Scanning For Web Vulnerabilities Tools and HTTP Utilities • Application Inspection Tools • Password Cracking and Brute-Force Tools • Web Attack
Block-4	<ul style="list-style-type: none"> • Cyber Crimes • Internet crime and Act • Intellectual Property in the Cyber world

Subject: BCAMA-401 Object Oriented Concepts & Programming-II (Advance Java)

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Network Basics and Socket overview, TCP/IP client sockets, URL, TCP/IP server sockets, Datagrams, java.net package Socket, Server Socket, InetAddress, URL, URL Connection
Block-2	<ul style="list-style-type: none">• The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL• Updates, Transaction Management.
Block-3	<ul style="list-style-type: none">• Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor ServletContext and ServletConfig interface, Attributes in Servlet, Request Dispatcher interface. The Filter API: Filter, FilterChain, Filter ConfigCookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting
Block-4	<ul style="list-style-type: none">• JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment

Subject: BCAMA-402 System Analysis and Design

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Basic Concept of Systems• Information System and System Analyst
Block-2	<ul style="list-style-type: none">• System Development Life Cycle• System Planning and Information Gathering
Block-3	<ul style="list-style-type: none">• Feasibility Study• Tools for System Analysis• System Design
Block-4	<ul style="list-style-type: none">• Input and Output• System Implementation and Maintenance• System Security and Audit

Subject: BCAMA-501 Software Engineering

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Definition of Software Engineering• Need for Software Engineering• Software Characteristics• Software Qualities
Block-2	<ul style="list-style-type: none">• Definition of System Analysis, Requirement Analysis, System Analyst,• Knowledge and Qualities of System Analyst, Role of a System Analyst• Feasibility Study and Types, Fact Gathering, User Transaction• Requirement, User Design Requirements, SRS
Block-3	<ul style="list-style-type: none">• System Development Methodologies• Analysis and Design Tools
Block-4	<ul style="list-style-type: none">• Structured System Design• Software Testing

Subject: BCAMA-502 Client/Server Architecture and Interface (C#)

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Client Server Computing: Functions of client, server, middleware components• Advantages and limitations of client server computing• Three Tier Architecture: Overview of thin client, application server, web server• Distributed Database• Real Application Clusters• High Performance Database Computing• Data Warehousing and Data Mining
Block-2	<ul style="list-style-type: none">• Architecture of Oracle Database and Oracle Instance• Physical and Logical Structures• Dedicated and Shared Server Configuration• Oracle Server Startup and Shutdown• Creating Database
Block-3	<ul style="list-style-type: none">• SQL• PL/SQL Procedural Extension,• PL/SQL data types & Control Structures
Block-4	<ul style="list-style-type: none">• Cursors, Stored Procedures & Functions• Database Triggers• Package Creation• Dynamic SQL• Collections & Objects

Subject: BCAMA-503 Introduction to Python Programming

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Introduction• Variable, Expression and Statement• Conditional Execution• Functions
Block-2	<ul style="list-style-type: none">• Iteration• String• Files• Lists
Block-3	<ul style="list-style-type: none">• Dictionaries• Tupels• Regular Expressions• Networked Program
Block-4	<ul style="list-style-type: none">• Python and Web Service• Object-Oriented Programming• Using database and SQL• Visualizing Data

Subject: BCAMI-505 Mobile Operating Systems

Block	Detailed Syllabus
Block-1	<ul style="list-style-type: none">• Generalize Operating System• Functionality Of Generalize Operating System• Operating System Structures• Mobile Computing
Block-2	<ul style="list-style-type: none">• Mobile Devices• Function Of Mobile Operating System• Mobile Operating System• Generalized Mobile Operating System Architecture and Comparison
Block-3	<ul style="list-style-type: none">• Basics of Android Operating System• Internal Mechanism of Android OS• ios Operating System
Block-4	<ul style="list-style-type: none">• Windows Phone• Blackberry• Symbian

Subject: BCAMA-602 Internet Programming (ASP.NET Using C#)

Block	Detail syllabus
Block-1	<ul style="list-style-type: none"> • Quick revision to HTML, Basic building blocks - Variable, Data Types, Operators, Conditions, Loops, Subroutines & Functions, Creation and Testing • Asp.Net Pages, Objects In Asp.Net, Object Creation With Parameters, Setting Objects Properties, Objects, Methods, Event Handlers • Basic controls - Literal Control, Label Control, Other Properties of Label Control, Collect Data from User (Textbox), Multi Line, Password.
Block-2	<ul style="list-style-type: none"> • Web and validation controls • Drop Down Lists, Other Properties of Dropdown List, Radio Buttons, Working With Checkbox WebControl, Validation Controls, Validator Control Basics, Requiredfield Validator, Using Page.IsValid, Compare Validator Control: Comparevalidator To CompareOne Input To Another, Rangevalidator Control, Regular Expression ValidatorControl
Block-3	<ul style="list-style-type: none"> • Working with Database and web controls - Sqldatasource Control, Data Connection, Configure Select Statement, Test The Query, Code Behind the Query, Working With Sql Queries, Filtering Sqldatasource Controls, Sorting Sqldatasource Controls, Sorting Sqldatasource Controls • working with dropdownlists, radiobuttons, checkboxes
Block-4	<ul style="list-style-type: none"> • Working with user • User Accounts, Membership, Database Created By Asp.Net, Putting Users Into Various Roles, Access Rules, Creating New User Accounts Via Websites, Autogeneratepassword & Required email Properties, Logging To The Website LoginControl, Logging Out, Logoutaction Property, Working With Loginview and Loginname Web Controls, Forgot Password, Changepassword Control

Subject: BCAMA-603 Mobile Application Development

Block	Detail syllabus
Block-1	<ul style="list-style-type: none"> • Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, • Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file
Block-2	<ul style="list-style-type: none"> • Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, • Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions

Block-3	<ul style="list-style-type: none"> • Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. • Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources
Block-4	<ul style="list-style-type: none"> • Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, • Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World

Subject: BCAMI-604 E-Commerce

Block-1	<ul style="list-style-type: none"> • History of E-commerce, Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce, E-transition Challenges, Business Models for Ecommerce
Block-2	<ul style="list-style-type: none"> • Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications – Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. • e-Marketing :Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding
Block-3	<ul style="list-style-type: none"> • E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. • Legal and Ethical Issues : Cyberstalking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children
Block-4	<ul style="list-style-type: none"> • e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems – Designing e-payment Systems – Digital Signature – Online Financial Services – Online Stock Trading

Subject: BCAMI-604 Data Warehousing and Data Mining

Block-1	<ul style="list-style-type: none"> • Data Warehouse: Introduction to Data Warehouse, Differences between operational database systems and data Warehouse, Data Warehouse characteristics, Data Warehouse Architecture and its components, Extraction-Transformation-Loading, Logical (Multidimensional), Data Modeling, Schema Design, star and snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non-Addictive Measures;
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	Fatless-Facts, Dimension Table characteristics; OLAP cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP
Block-2	<ul style="list-style-type: none"> • Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing- Data Cleaning, Missing Data, Dimensionality Reduction, Feature Subset Selection, Data Transformation; Measures of similarity and dissimilarity-Basics
Block-3	<ul style="list-style-type: none"> • Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation, APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maximal Frequent Item Set, Closed Frequent Item Set
Block-4	<ul style="list-style-type: none"> • Classification: Problem definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision trees-Decision Tree Construction, Methods for expressing attribute test conditions, Algorithm for Decision tree Induction, Naïve-Bayes Classifier, Bayesian Belief Networks; K-nearest neighbor classification-Algorithm and characteristics. • Clustering: Problem Definition, Clustering overview, Evaluation of clustering algorithms, Partitioning clustering K-Means Algorithm, K-Means Additional Issues, PAM Algorithm, Hierarchical Clustering-Algorithm- Agglomerative Methods and Divisive Methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and weakness, Outlier Detection

Subject: BCAAE-605 Software Testing

Block-1	<ul style="list-style-type: none"> • Introduction to Software Engineering: Characteristics, Emergence of Software Engineering, Software Metrics & Models, Process & Product Metrics. Software Life Cycle Models: Waterfall, Prototype and Spiral Models and their Comparison
Block-2	<ul style="list-style-type: none"> • Software Project Management: Size Estimation- LOC and FP Metrics, Cost Estimation, COCOMO Model • Software Requirements Specification: SRS Documents, their Characteristics and Organization
Block-3	<ul style="list-style-type: none"> • Software Design: Classification, Software Design Approaches, Function Oriented Software Design, Structured Analysis- Data flow Diagrams and Structured Design, Introduction to Object Oriented Design
Block-4	<ul style="list-style-type: none"> • Coding and Testing of Software: Unit Testing, Block Box Testing, White Box Testing, Debugging, Program Analysis Tools, System Testing • Software Reliability and Quality Assurance: Reliability Metric- Musa's Basic Model. • Software Quality Assurance: ISO 9000 and SEI CMM and their Comparison. • Software Maintenance: Maintenance Process Models and Reverse Engineering, Estimation of Maintenance Costs

Subject: BCAMA-701 Internet of Things

Block-1	<ul style="list-style-type: none">• Introduction: IOT - What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues• IOT PROTOCOLS - Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security
Block-2	<ul style="list-style-type: none">• IOT ARCHITECTURE - IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction
Block-3	<ul style="list-style-type: none">• WEB OF THINGS - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence
Block-4	<ul style="list-style-type: none">• IOT APPLICATIONS - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

Subject: BCAMA-702 Cyber Security Tools Techniques and Counter Measures

Block-1	<ul style="list-style-type: none">• Introduction to Cyber Security, Cyber Security Essentials, Attack Vectors, Threat, Risk and Vulnerability, Advance Persistent Threat and Cyber Kill Chain, Cyber Security Framework
Block-2	<ul style="list-style-type: none">• Network Defense Tools, Firewall and Packet Filters, Introduction to Windows and Linux Firewall, Attacks on Wireless Networks
Block-3	<ul style="list-style-type: none">• Web Application Tools, Scanning For Web Vulnerabilities Tools and HTTP Utilities, Application Inspection Tools, Password Cracking and Brute-Force Tools, Web Attack
Block-4	<ul style="list-style-type: none">• Introduction to Cyber Crime, Law and Investigation, Cyber Crimes, Internet crime and Act, Intellectual Property in the Cyber world

Subject: BCAMA-703 Advanced Python Programming

Block-1	<ul style="list-style-type: none">• OOPs in python: Features of Object Oriented Programming system (oops)- classes and objects, encapsulation, abstraction, inheritance, polymorphism, constructors and destructorsClasses and objects: Creating a class, the self-variable, types of variables, namespaces, types of methods, instance methods, class methods, static methods, passing members of one class to another class, inner classes,Inheritance and polymorphism: Inheritance in python, types of inheritance- single inheritance, multilevel inheritance, hierarchical inheritance, multiple inheritance, constructors in inheritance, overriding super class constructors and methods, the super() method, method resolution order (mro), polymorphism, duck typing, operator overloading, method overloading, method overriding, Abstract classes and interfaces: Abstract class, abstract method, interfaces in python, abstract classes vs. Interfaces
Block-2	<ul style="list-style-type: none">• Working with files: Files, opening and closing a file, working with text files containing strings, knowing whether a file exists or not, the seek() and tell() methods, random accessing of binary files, zipping and unzipping files, working with directories, running• Regular expressions: sequence characters in regular expressions, quantifiers in regular expressions, special characters in regular expressions, using regular expression on files, retrieving information from an html file• Scientific and Numerical Computing with Python• Introduction to Scientific and Numerical Computing, NumPy, Matplotlib, Pandas
Block-3	<ul style="list-style-type: none">• Database in python: Using SQL with python, retrieving rows from a table, inserting rows into a table, deleting rows from a table, updating rows in a table, creating database tables through python, Exception handling in databases.• Exceptions in python: Errors in a python program, compile & run-time errors, logical error, exceptions-exception handling, types of exceptions, the except block, the assert statement, user-defined exceptions, logging the exceptions
Block-4	<ul style="list-style-type: none">• Networking: Protocols,server-client architecture, tcp/ip and udp communication• Graphical user interface: Creating a GUI in python, Widget classes, Working with Fonts and Colours, working with Frames, Layout manager, Event handling

Subject: BCAMA-801 Big Data Analytics

Block	Detail syllabus
Block-1	<ul style="list-style-type: none"> • Introduction To Big Data • Data Storage and Analysis - Characteristics of Big Data – Big Data Analytics - Typical Analytical Architecture – Requirement for new analytical architecture – Challenges in Big Data Analytics – Need of big data frameworks
Block-2	<ul style="list-style-type: none"> • Hadoop Framework • Hadoop – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system - Hadoop Components – Hadoop 1 vs Hadoop 2 – Hadoop Daemon’s – HDFS Commands – Map Reduce Programming: I/O formats, Map side join, Reduce Side Join, Secondary sorting, Pipelining MapReduce jobs
Block-3	<ul style="list-style-type: none"> • Hadoop Ecosystem • Introduction to Hadoop ecosystem technologies: Serialization: AVRO, Co-ordination: Zookeeper, Databases: HBase, Hive, Scripting language: Pig, Streaming: Flink, Storm
Block-4	<ul style="list-style-type: none"> • Spark Framework • Introduction to GPU Computing, CUDA Programming Model, CUDA API, Simple Matrix, Multiplication in CUDA, CUDA Memory Model, Shared Memory Matrix Multiplication, Additional CUDA API Features

Subject: BCAMA-802 OOAD using UML

Block	Detail syllabus
Block-1	<ul style="list-style-type: none"> • Introduction to UML, Importance of Modeling, Principles of Modeling, Object oriented modeling, • Conceptual model of the UML, Architecture of UML, Software Development Life Cycle.
Block-2	<ul style="list-style-type: none"> • Basic Structural Modeling, Classes, Relationships, Common Mechanisms, Basic Diagrams, Advanced • Structural Modeling, Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages. • Class and Object Diagrams, Terms, Concepts, Modeling Techniques for Class Diagrams
Block-3	<ul style="list-style-type: none"> • Basic Behavioral Modeling-I, Interactions, Interaction Diagrams. • Basic behavioral Modeling-II, Usecases, Use case Diagrams, Activity Diagrams.
Block-4	<ul style="list-style-type: none"> • Advanced Behavioral Modeling, Events and Signals, State Machines, Processes and Threads, Time and Space, State Chart Diagrams. • Architectural Modeling, Component, Deployment, Component Diagrams, Deployment Diagram

Subject: BCAMA-803 Cloud Infrastructure and Services

Block	Detail syllabus
Block-1	<ul style="list-style-type: none">• Introduction to Cloud Technologies• Introduction to the Cloud Computing, History of cloud computing, Cloud service options, Cloud Deployment models, Business concerns in the cloud• Virtualization and Cloud Platforms• Exploring virtualization, Load balancing, Hypervisors, Machine imaging, Cloud marketplace overview, Comparison of Cloud providers
Block-2	<ul style="list-style-type: none">• Introduction to AWS• AWS history, AWS Infrastructure, AWS services, AWS ecosystem Programming, management console and storage on AWS• Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Glacier - Content delivery platforms
Block-3	<ul style="list-style-type: none">• AWS identity services, security and compliance• Users, groups, and roles - Understanding credentials, Security policies, IAM abilities and limitations, AWS physical security - AWS compliance initiatives, Understanding public/private keys, Other AWS security capabilities• AWS computing and marketplace• Elastic cloud compute - Introduction to servers, Imaging computers, Auto scaling, Elastic load balancing, Cataloging the marketplace, AMIs, Selling on the marketplace
Block-4	<ul style="list-style-type: none">• AWS networking and databases• Virtual private clouds, Cloud models, Private DNS servers (Route 53), Relational database service – DynamoDB, ElastiCache, Redshift• Other AWS services and management services• Analytics services, Application services, Cloud security, CloudWatch, CloudFormation, CloudTrail, OpsWorks

Bachelor of Computer Application (BCA) Practical List

BCAMA-101 Fundamental of Programming using C language

1. Write a c program to print any message.
2. Write a c program to print any number.
3. Write a c program to accept two numbers and perform arithmetic operation on it.
4. Write a c program to accept two numbers and find greater number among them.
5. Write a c program to find smaller number among three numbers.
6. Write a c program to print numbers is odd or even..
7. Write a c program to print numbers prime or not.
8. Write a c program to print numbers is divisible by 5 or not.
9. Write a c program to print series 2 4 6 8 . . N.
10. Write a c program to print series 1 3 5 7 . . N.
11. Write a c program to print series 1 5 10 15 . . N.
12. Write a c program to find smaller number among two number using? : Operator
13. Write a c program to print series 1 2 4 5 7 8 10
using goto statement.
14. Write a c program to print factorial of a given number.
15. Write a c program to swap two numbers without using third variable.
16. Write a c program to print Fibonacci series.
17. Write a c program to check palindrome number.
18. Write a c program to check Armstrong number.
19. Write a c program to reverse given number.
20. Write a c program to print following patterns
 1
 1 2
 1 2 3
 1 2 3 4
21. Write a c program to print following patterns
 *
 * *
 * * *
 * * * *
22. Write a c program to print Array.
23. Write a c program to accept and print addition of two Array.
24. Write a c program to accept and print multiplication of two Array.
25. Write a c program to accept and print Matrix.
26. Write a c program to print addition of two Matrixes.
27. Write a c program to print Matrix Multiplication.
28. Write a c program to print single character.

29. Write a c program to print name of person.
30. Write a c program to accept two strings and merge them.
31. Write a c program to copy one string into another string.
32. Write a c program to accept two numbers and perform arithmetic operation on it using user define function.
33. Write a program in C to swap two numbers using a function.
34. Write a c program to calculate area of rectangle using user define function.
35. Write a c program to addition of two array using function.
36. Write a program in C to convert a decimal number to a binary number using the function.
37. Write a program in C to check whether a number is a prime number or not using the function.
38. Create a structure called "Student" with members name, age, and total marks. Write a C program to input data for two students, display their information, and find the average of total marks.
39. Define a structure named Time with members hours, minutes, and seconds. Write a C program to input two times, add them, and display the result in proper time format.
40. Create a structure named Book to store book details like title, author, and price. Write a C program to input details for three books, find the most expensive and the lowest priced books, and display their information.
41. Define a structure named Circle to represent a circle with a radius. Write a C program to calculate the area and perimeter of two circles and display the results.
42. Create a structure named "Employee" to store employee details such as employee ID, name, and salary. Write a program to input data for three employees, find the highest salary employee, and display their information.
43. Write a program in C to show the basic declaration of a pointer.
44. Write a program in C to demonstrate the use of the &(address of) and *(value at address) operators.
45. Write a program in C to add two numbers using pointers.
46. Write a program in C to add numbers using call by reference.
47. Write a program in C to find the max number between two numbers using a pointer.
48. Pointer program to swap two numbers without using 3rd variable.
49. Write a program in C to store n elements in an array and print the elements using a pointer.
50. Write a program in C to print all permutations of a given string using pointers.
51. Write a program in C to calculate the length of a string using a pointer.
52. Write a program in C to sort an array using a pointer.
53. Write a program in C to create and store information in a text file.
54. Write a program in C to read an existing file.
55. Write a program in C to write multiple lines to a text file.
56. Write a program in C to read the file and store the lines in an array.
57. Write a program in C to find the number of lines in a text file.
58. Write a program in C to find the content of a file and the number of lines in a text file.
59. Write a program in C to count the number of words and characters in a file.
60. Write a program in C to delete a specific line from a file.

61. Write a program in C to replace a specific line with another text in a file.
62. Write a program in C to append multiple lines to the end of a text file.
63. Write a program in C to copy a file to another name.
64. Write a program in C to merge two files and write them to another file.
65. Write a program in C to remove a file from the disk.

BCAMI-103 Introduction to Internet Technologies and HTML

1. Write a code for html webpage which displays your name, college name, and semester.
2. Write a code for html webpage which displays your name, college name, and semester using formatting text elements.
3. Write a code for create 5 items in unordered list.
4. Write a code for create 5 items in ordered list.
5. Write a code for create 3 description
6. Write a code using table.

A)

Firstname	Lastname	Age
Priya	Sharma	24
Arun	Singh	32
Sam	Watson	41

B)

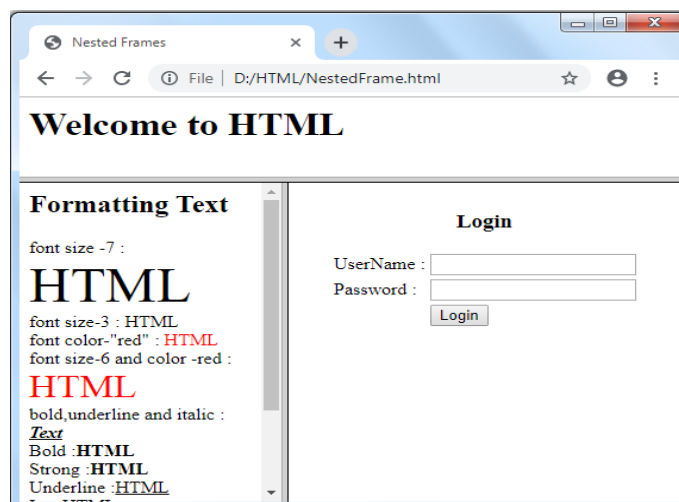
Firstname	Lastname	Age
Priya	Sharma	24
Arun	Singh	32
Sam	Watson	41

C)

Cell that spans two rows:

Name:	Vikas Rawat
Telephone:	9125577854 8565557785

7. Write a code for html following webpage using frame.



8. Write a code for html webpage which redirects to Google page. (using < a> tag) .
9. Write a code for html webpage which redirects to polygwali website , Google and some documents using < a> tag .
10. Write a code for html webpage which displays the image of Virat Kohli . (using < img> tag) .
11. Write a code for html webpage which displays the image of Sachin Tendulkar (using < img> tag) .
12. Write a code for html web page which displays your name in left , college name in right , and semester in center , your branch in red background color and text size - 50px .
13. Write a code for html webpage which displays your name in < h1> tag and also in blue color and < p> tag uses purple background color.
14. Write a code for html webpage which displays some text formatting and uses < em> , < i> , < small> , < b> , < strong> , < sup> , < sub> , < ins> , < del> and < mark> tag .
15. Write a code for html webpage which displays some background color and text of red colour .
16. Write a CSS file and attached to any 3 html webpage.
17. Write a code for html webpage which displays virat kohli image as background .
18. Write a code for html webpage which displays table using < tr> and < td> tag .
19. Make a form in html web page which takes all the details of person using CSS.
20. Make a form in html web page which takes all the details of person using CSS. (Ex - Name , Password , Age , Date of Birth , Month of Admission , Year of 10 Passed , Gender , Qualification , Select Branch , Category (SC/ST/Gen/OBC) using datalist , Select Color , Select Range (0 to 100) , Submit button) .
21. Write a code for html webpage which displays a list .
22. Use Class, ID selectors to style various elements of HTML Page. Ex: create four < p> and four < h1> element. Center align two < p> and two < h1> using Class.Colour all < p> to blue using class.Last < h1> should colour in yellow using id.
23. Use Div and span in a page and color two words with same colors.
24. Write a code for html webpage which displays background.
25. Write a code for html webpage which displays all practical on Border , Margin , Padding of elements.
26. Write a code for html webpage which displays all practical on Text/font formatting, width-Height.

BCAMA-202 Data Structure Using C

1. Write a c program to print Array.
2. Write a c program to accept and print addition of two Array.
3. Write a c program to accept and print multiplication of two Array.
4. Write a c program to accept and print Matrix.
5. Write a c program to print addition of two Matrixes.
6. Write a c program to print Matrix Multiplication.
7. To implement stack operations using array.
8. To convert infix expression to its postfix form using stack operations.
9. To implement queue operations using array.
10. Write a c program to create a link list using array and perform operations such as display, insertions and deletions.
11. To define a singly linked list node and perform operations such as insertions and deletions dynamically.
12. To implement stack operations using linked list.
13. To implement queue operations using linked list.
14. To construct a binary search tree and perform search.
15. To implement AVL Trees.
16. To Implementation Of Heap Using Priority Queues
17. To represent graph using adjacency list.
18. To implement breadth first graph traversal.
19. To implement Depth first graph traversal.
20. To perform linear search of an element on the given array.
21. To locate an element in a sorted array using Binary search method.
22. To sort an array of N numbers using Insertion sort.
23. To sort an array of N numbers using Bubble sort.
24. To sort an array of N numbers using Quick sort.
25. To sort an array of N numbers using Merge sort.
26. Write a program in C to read an existing file.
27. Write a program in C to write multiple lines to a text file.
28. Write a program in C to read the file and store the lines in an array.
29. Write a program in C to find the number of lines in a text file.
30. Write a program in C to find the content of a file and the number of lines in a text file.
31. Write a program in C to count the number of words and characters in a file.
32. Write a program in C to delete a specific line from a file.
33. Write a program in C to replace a specific line with another text in a file.
34. Write a program in C to append multiple lines to the end of a text file.
35. Write a program in C to copy a file to another name.
36. Write a program in C to merge two files and write them to another file.
37. Write a program in C to remove a file from the disk.

BCAMI-203 Database Management System (DBMS)

DBMS Practical-1

Q_1 To create a table called Employee with the following Structure and Answer the following queries.

Name	Type
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

1. Add a column commission with domain to the Employee table.
2. Insert any five records in to the table.
3. Update the column details of job.
4. Rename the column of Employ table using alter command.
5. Delete the employee whose empno is 19.

Q_2 Create department table with the following structure and answer the following queries.

Name	Type
Deptno	Number
DeptName	Varchar2(20)
Location	Varchar2(20)

1. Insert values into the table.
2. List the records of emp table grouped by dept no.
3. Update the record where dept no is 9.
4. Delete any column data from the table.

Q_3 To create a table called Customer table and answer the following queries.

Name	Type
Custname	Varchar2(20)
custstreet	Varchar2(20)
custcity	Varchar2(20)

1. Insert records into the table.
2. Add salary column to the table.
3. Alter the table column domain.
4. Drop salary column of the customer table.
5. Delete the rows of customer table whose ust_city is „hyd“.

Q_4 Create a table called branch table.

Name	Type
branchname	Varchar2(20)
Branch	Varchar2(20)
asserts	Varchar2(20)

1. To increase the size of data type for asserts to the branch and answer the following queries

Q_5 Create a table called sailor table and answer the following queries

Sailors(sid: integer, sname: string, rating: integer, age: real);

1. Add column age to the sailortable.
2. Insert values into the sailortable.
3. Update the column details of sailor.
4. Insert null values into thetable.

Q_6 To Create a table called reserves table and answer the following queries

Reserves(sid: integer, bid: integer, day: date)

1. Add column time to the reserves table.
2. Alter the column day data type to date.
3. Drop the column time in the table.
4. Delete the row of the table with some condition.

DBMS Practical-2 (Using MYSQL)

Experiment 1: Introduction to MySQL, Database creation, Table creation.

1. Create a new database (Select an example of your own wish)
2. View all databases
3. Learn about data types of attributes and create a new table in the database with different data types
4. Use of alter command to add and drop attributes
5. Modify attribute name
6. Use of desc command to display information about a table
7. Rename a table
8. Create more tables for your database

Experiment 2: Data insertion, update/modification/Delete and retrieval through MySQL. Basic SQL structure. Query implementation

1. Insert tuples in the table including null values in the tuple
2. Update values in the table
3. Delete tuples in the table

4. Query to view all tuples of the table
5. Run basic queries to view particular attributes of a table
6. Run basic queries to use basic comparison operators
7. Run basic queries to view find certain tuples of a table
8. Run queries using order by, limit operators

Experiment 3: Enforcing integrity constraints (Domain, Key constraints (Primary/Foreign keys), NOT NULL, UNIQUE, DEFAULT, Check)

1. Create a table with appropriate primary key
2. Alter a table to add primary key
3. Drop a primary key
4. Add a foreign key while create a table
5. Alter table to add a foreign key
6. Drop a foreign key
7. Include constraints like null/not noll, unique, default, check
8. Drop a constraint

Experiment 4: Creating and updating View. Query implementation using View

1. Learn about the objective of using views
 2. Learn to create views
 3. Insert, delete, update data in views
 4. Run queries on views
- Experiment 5: Use of aggregate functions (AVG, COUNT, MIN, MAX, SUM)
5. Learn about aggregate functions
 6. Run queries to find sum, average, count, count-distinct, minimum, maximum
 7. Run queries using aggregate function with null values

Experiment 6: Use of Join operator (Natural join, Outer join (left, right and full))

1. Run queries to find natural join, join, outer join, right join, left join of two or more tables
2. Run queries to use union, union all, intersect operators
3. Run queries to use intersect, in, between, not between operators

Experiment 7: Query optimization through Nested Query (Use of logical connectives, set comparison operators, Union, Intersect, Except, Exists clauses)

1. Run Basic queries involving nested/subqueries
2. Use of in/not in operator for nested queries
3. Use of all, some, exists, not exists for nested queries

Experiment 8: Use of Group By and Having clause, Trigger creation

1. Learn about group by operator and run queries using group by operator
2. Run queries using group by and having operators
3. Use of aggregate operators with group by and having operators

Experiment 9: Index creation through SQL

1. Learn to create index in MYSQL
2. View index
3. Change ordering of index key
4. Compare time taken to search with and without using index

Experiment 10-13: Mini-projects implementation in RDBMS environment

1. Make a relational model of a database of your choice with minimum 5
2. tables and use appropriate foreign keys in the relational model
3. Create the database on MYSQL
4. Construct appropriate primary, foreign keys, add additional constraints
5. learned in previous class
6. Create appropriate view on the database
7. Create index for appropriate tables
8. Run basic queries of updating, insertion, deletion
9. Run queries that involve aggregate operators, group by, having
10. operators
11. Try some subqueries and operators used in subqueries
12. Use other operators studied in previous practicals

BCAMA-301 Object Oriented Concepts & Programming – I

- 1.** Write a Java program to create a class called "Person" with a name and age attribute. Create two instances of the "Person" class, set their attributes using the constructor, and print their name and age.
- 2.** Write a Java program to create a class called "Dog" with a name and breed attribute. Create two instances of the "Dog" class, set their attributes using the constructor and modify the attributes using the setter methods and print the updated values.
- 3.** Write a Java program to create a class called "Rectangle" with width and height attributes. Calculate the area and perimeter of the rectangle.
- 4.** Write a Java program to create a class called "Circle" with a radius attribute. You can access and modify this attribute. Calculate the area and circumference of the circle.
- 5.** Write a Java program to create a class called "Book" with attributes for title, author, and ISBN, and methods to add and remove books from a collection.
- 6.** Write a Java program to create a class called "Employee" with a name, job title, and salary attributes, and methods to calculate and update salary.
- 7.** Write a Java program to create a class called "Bank" with a collection of accounts and methods to add and remove accounts, and to deposit and withdraw money. Also define a class called "Account" to maintain account details of a particular customer.
- 8.** Write a Java program to create class called "TrafficLight" with attributes for color and duration, and methods to change the color and check for red or green.
- 9.** Write a Java program to create a class called "Employee" with a name, salary, and hire date attributes, and a method to calculate years of service.
- 10.** Write a Java program to create a class called "Student" with a name, grade, and courses attributes, and methods to add and remove courses.
- 11.** Write a Java program to create a class called "Library" with a collection of books and methods to add and remove books.
- 12.** Write a Java program to create a class called "Airplane" with a flight number, destination, and departure time attributes, and methods to check flight status and delay.
- 13.** Write a Java program to create a class called "Inventory" with a collection of products and methods to add and remove products, and to check for low inventory.
- 14.** Write a Java program to create a class called "School" with attributes for students, teachers, and classes, and methods to add and remove students and teachers, and to create classes.

- 15.** Write a Java program to create a class called "MusicLibrary" with a collection of songs and methods to add and remove songs, and to play a random song.
- 16.** Write a Java program to create a class called "Shape" with abstract methods for calculating area and perimeter, and subclasses for "Rectangle", "Circle", and "Triangle".
- 17.** Write a Java program to create a class called "Movie" with attributes for title, director, actors, and reviews, and methods for adding and retrieving reviews.
- 18.** Write a Java program to create a class called "Restaurant" with attributes for menu items, prices, and ratings, and methods to add and remove items, and to calculate average rating.
- 19.** Write a Java program to create a class with methods to search for flights and hotels, and to book and cancel reservations.
- 20.** Write a Java program to create a class called "BankAccount" with attributes for account number, account holder's name, and balance. Include methods for depositing and withdrawing money, as well as checking the balance. Create a subclass called "SavingsAccount" that adds an interest rate attribute and a method to apply interest.
- 21.** Write a Java program to create a class called "Vehicle" with attributes for make, model, and year. Create subclasses "Car" and "Truck" that add specific attributes like trunk size for cars and payload capacity for trucks. Implement a method to display vehicle details in each subclass.
- 22.** Write a Java program to create a class called "Customer" with attributes for name, email, and purchase history. Implement methods to add purchases to the history and calculate total expenditure. Create a subclass "LoyalCustomer" that adds a discount rate attribute and a method to apply the discount.
- 23.** Write a Java program to create a class called "Course" with attributes for course name, instructor, and credits. Create a subclass "OnlineCourse" that adds attributes for platform and duration. Implement methods to display course details and check if the course is eligible for a certificate based on duration.
- 24.** Write a Java program to create a class called "ElectronicsProduct" with attributes for product ID, name, and price. Implement methods to apply a discount and calculate the final price. Create a subclass "WashingMachine" that adds a warranty period attribute and a method to extend the warranty.
- 25.** Write a Java program to create a class called "Building" with attributes for address, number of floors, and total area. Create subclasses "ResidentialBuilding" and "CommercialBuilding" that add specific attributes like number of apartments for residential and office space for commercial buildings. Implement a method to calculate the total rent for each subclass.

- 26.** Write a Java program to create a class called "Event" with attributes for event name, date, and location. Create subclasses "Seminar" and "MusicalPerformance" that add specific attributes like number of speakers for seminars and performer list for concerts. Implement methods to display event details and check for conflicts in the event schedule.
- 27.** Write a Java program to create a class called "CustomerOrder" with attributes for order ID, customer, and order date. Create a subclass "OnlineOrder" that adds attributes for delivery address and tracking number. Implement methods to calculate delivery time based on the address and update the tracking status.
- 28.** Write a Java program to create a class called "Reservation" with attributes for reservation ID, customer name, and date. Create subclasses "ResortReservation" and "RailwayReservation" that add specific attributes like room number for hotels and seat number for flights. Implement methods to check reservation status and modify reservation details.
- 29.** Write a Java program to create a class called "Pet" with attributes for name, species, and age. Create subclasses "Dog" and "Bird" that add specific attributes like favorite toy for dogs and wing span for birds. Implement methods to display pet details and calculate the pet's age in human years.
- 30.** Write a Java program to create a class called "GymMembership" with attributes for member name, membership type, and duration. Create a subclass "PremiumMembership" that adds attributes for personal trainer availability and spa access. Implement methods to calculate membership fees and check for special offers based on membership type.

BCAMA-303 Relational Database Management System (RDBMS)

1. Write a simple PL/SQL script that displays "Hello World".
2. Write a PL/SQL stored procedure to display 'Hello World'.
3. Write a PL/SQL script that performs simple arithmetic like Addition, Subtraction, Multiplication & Division of input numbers.
4. Create two tables as shown below:
Table 1: product (product id, product name, supplier name, unit price) Table 2: product_price_history(product_id, product_name, supplier name, unit price)
Insert appropriate data into Table 1 ie. the product" table.
Now write a PL/SQL trigger that automatically copies a row from product table to product price history table whenever the unit price of a product is changed in the product table.
Note: product table contains new updated value of unit price while product price history table contains the old value.
5. Write a PL-SQL script to compare three given numbers and display them in ascending order.
6. Create the following table:
Emp(E_ID, E_Name, E_Dept, E_Salary)
Insert appropriate data into Emp table.
The attribute E_Dept contains values like (1.T., Accounts, Sales)...
Write a PL-SQL cursor that increments the salary of employees of 1.T. Dept. by 20%.

BCAMA-401 Object Oriented Concepts & Programming-II (Advance Java)

1. Write a program to create a frame using AWT. Implement mouseClicked(), mouseEntered() and mouseExited() events. Frame should become visible when mouse enters it.
2. Using AWT, write a program to display a string in frame window with pink colour as background.
3. Using AWT, write a program to create two buttons named "Red" and "Blue". When a button is pressed the background colour should be set to the colour named by the button's label.
4. Using AWT, write a program which responds to KEY_TYPED event and updates the status window with message ("Typed character is: X"). Use adapter class for other two events.
5. Using AWT, write a program to create two buttons labelled 'A' and 'B'. When button 'A' is pressed, it displays your personal information (Name, Course, Roll No, College) and when button 'B' is pressed, it displays your CGPA in previous semester.

BCAMA-502 Client/Server Architecture and Interface (C#)

Write a C# Program of Following.

1. Print Hello World
2. How to sum 2 Numbers
3. How to check for Even and Odd Numbers
4. How to count 1s in number

5. How to find ASCII values of characters
6. How to find a Leap year
7. How to swap 2 Numbers
8. Celsius to Fahrenheit
9. How to get length of a String
10. How to Reverse Numbers
11. How to count number of Words
12. How to check for Vowels and Consonants
13. Count number of Vowels and Consonants
14. How to count number of Alphabets, Digits and Special Characters
15. How to find a Substring
16. Date Format
17. How to get square root
18. How to get the cube root
19. How to add 2 Dates
20. How to add 2 Binary numbers
21. How to sum 1-N Numbers
22. How to create a Fibonacci Series
23. How to detect a Prime Number
24. How to check for Palindrome
25. How to get factorial of a Number
26. How to check for Armstrong Numbers
27. How to Reverse Number
28. How to convert from Decimal to Binary
29. How to create Alphabet Triangle
30. How to convert Digits to Text
31. How to Check for duplicate elements in an Array
32. How to Add 2 Matrices
33. How to Bubble Sort Array
34. How to sort Array Selection Sorting
35. How to get LCM and GCD
36. How to create Binary Triangle
37. How to create Rectangular pattern
38. How to create a Triangular pattern
39. Arithmetic Calculator
40. How to use if else Statement
41. How to use else if Statement
42. How to get the Greatest of 3 Numbers
43. How to create Multiplication Table using while loop
44. How to create a Multiplication Table using for loop
45. How to create a multiplication Table using do while Loop
46. Add 2 Numbers using Function
47. How to find HCF
48. How to get the magnitude of an Integer

49. How to get Factors of a Number
50. How to detect the State of a Number
51. How to get the Minimum and Maximum Number in an Array
52. How to calculate Acceleration
53. How to calculate sum of digits entered by user
54. How to generate Random Numbers
55. How to calculate the square feet of a Room
56. How to create a Pythagoras Theorem
57. How to create a Numerical Triangle
58. How to create a Binary Triangle
59. How to calculate $\sin()$
60. How to create a Cosine of Zero
61. How to convert from Binary to Decimal
62. How to convert from Decimal to Octal
63. Convert Decimal to Hexadecimal
64. How to get Employee Data
65. How to get Employee Data using Nested Structure
66. Area of Rectangle using Structure
67. Power of Number using Recursion
68. How to use Static property
69. How to use Static Constructor
70. Single Cast Delegate
71. Multiple Cast Delegate
72. Anonymous Delegate
73. Single Cast Delegate and Event
74. Multicast Delegate and Event
75. Trigonometric Functions

BCAMA-503 Introduction to Python Programming

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: $c/5 = f-32/9$]
10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow (x, n)
20. Write a Python class to reverse a string word by word

BCAMA-602 Internet Programming (ASP.NET Using C#)

- 1 Write a program to check whether empty query string is entered in Asp.
- 2 Write a program to change color of Label text control programmatically in Asp .Net
- 3 Write a program to Enable-Disable Textbox and change width of TextBox programmatically in Asp .Net
- 4 Write a program to increase and decrease font size programmatically.
- 5 Write C# code to display the asterisk pattern as shown below:

- 6 Write C# code to prompt a user to input his/her name and country name and then the output will be Shown as an example: Hello Ram from country India!
- 7 Write C# code to do the following
 - Convert binary to decimal
 - Convert decimal to hexadecimal
 - Convert decimal to binary
 - Convert decimal to octal
- 8 Write C# code to convert infix notation to postfix notation.
- 9 Write a C# code to convert digits to words
- 10 Write a C# code to Convert following currency conversion. Rupees to dollar, frank, euro.
- 11 Write a C# code to Perform Celsius to Fahrenheit Conversion and Fahrenheit to Celsius conversion.
- 12 Write ASP.Net program to Store Objects in Session State and Storing Session State in SQL Server.
- 13 To develop calculator application using C#.net.
- 14 To develop stock management system using various controls like listbox and drop down list.
- 15 To design and develop photo viewer and file explorer application in C#.
- 16 To develop wordpad application in visual studio.
- 17 Develop an application for user management using the concept of ADO.NET and windows form.
- 18 To study and implement Validation controls in ASP.NET.
- 19 Demonstrate the concept of session and cookies with login functionality.
- 20 To design and develop profile management system in ASP.NET
- 21 Implement and Consume web service in ASP.NET application.
- 22 Study about Deploying window and web application.

BCAMA-603 Mobile Application Development

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the red color with white background. and change the app icon
2. To understand Activity, Intent Create sample application with login module.(Check username and password) On successful login, go to next screen. And on failing login, alert user using Toast. Also pass username to next screen.
3. Create login application where you will have to validate EmailID (UserName). Till the username and password is not validated, login button should remain disabled.
4. Create spinner with strings taken from resource folder (res >> value folder). On changing spinner value, change image.
5. Understand Menu option. Create an application that will change color of the screen, based on selected options from the menu.
6. Create an application that will display toast (Message) on specific interval of time.
7. Create an application that will display all Dialogs on buttons click
8. Create an application that will accept url from edit text and on button click display that url on web view
9. Understanding of UI :
Create an UI such that, one screen have list of all the types of cars. On selecting of any car name, next screen should show Car details like : name , launched date ,company name, show different colors in which it is available.
10. Create an application to play audio file and use basic start, pause, play and stop operation while playing.
11. Create an application to play video file and use basic start,pause,play forward and stop operation while playing.
12. Create an application that will have spinner with list of animation names. On selecting animation name, that animation should affect on the images displayed below.
13. Create an application to make Insert, update, Delete and retrieve operation on the SQLite database with list View.
14. Create an application to make Insert, update, Delete and retrieve operation on the Remote database (MySql) with list View.
15. Create an application to show current location on google maps as well as accept location from edittext and search on google map.