MATS SCHOOL OF INFORMATION TECHNOLOGY

SYLLABUS

For

Three Year Full - Time Degree Course

Bachelor of Computer Applications

(BCA)

2025-28

(Semester Based Course)

Programme Outcomes:

No.	Programme Outcomes:
PO1	Apply computing fundamentals, specialized knowledge, math, and domain expertise to provide effective computing solutions.
PO2	Identify, formulate, and solve complex computing problems using computing principles, drawing substantiated conclusions.
PO3	Design and assess computing solutions and systems, considering societal aspects and specified needs.
PO4	Utilize modern computing tools, techniques, and resources, understanding their limitations.
PO5	Commit to professional ethics, responsibilities, and norms in computing practice.
PO6	Recognize the need for and engage in lifelong learning for continual development as a computing professional.
PO7	Communicate effectively within the computing community and society, producing clear reports, documentation, presentations, personality development, health and wellbeing.

Detailed Syllabus

SYLLABUS PROGRAM: BCA SEMESTER: I			
Course Code: BCA DSC 01	**Credit:03**	**Course: Computer System Architecture and Digital Electronics**	**L:02|T:01|P:00**

No.	Module Description	
Module 1:	**Computer Organization**	
	Unit 1.1:	Introduction of Computers, Characteristics of computers
	Unit 1.2:	Evolution of computer
	Unit 1.3:	Input unit, Output unit and Storage unit
	Unit 1.4:	Arithmetic Logic Unit (ALU), Control Unit (CU), Central Processing Unit (CPU)
	Unit 1.5:	System concepts
	Unit 1.6:	Classification of computers
	Unit 1.7:	Types of Memory: RAM, ROM, PROM, EPROM, EEPROM, Cache
Module 2:	**Digital System and Boolean Algebra**	
	Unit 2.1:	Overview of digital systems and their application, number system: representation and conversion
	Unit 2.2:	Binary coded decimal (BCD)representation
	Unit 2.3:	Boolean algebra fundamentals
	Unit 2.4:	Basic Theorem and properties of Boolean algebra
	Unit 2.5:	Boolean function
	Unit 2.6:	Canonical and standard forms
Module 3:	**Gate-level Minimization**	
	Unit 3.1:	Introduction
	Unit 3.2:	The map method
	Unit 3.3:	Karnaugh maps(K-maps) for simplifying Boolean expressions.
	Unit 3.4:	product of sums simplification
	Unit 3.5:	Don’t care condition
	Unit 3.6:	NAND and NOR implementation
Module 4:	**Computer Software**	
	Unit 4.1:	Introduction to Software
	Unit 4.2:	Relationship between Hardware and Software
	Unit 4.3:	Types of Software
	Unit 4.4:	Logical System Architecture
	Unit 4.5:	Firmware, Middleware
	Unit 4.6:	Pre-written Software, Customized Software
	Unit 4.7:	Developing Customized Software
	Unit 4.8:	Software development Life cycle
	Unit 4.9:	Software Engineering
	Unit 4.10:	Introduction to Operating System, Functions of an operating systems

Module 5:	**Cyber Security**	
	Unit 5.1:	Cyber security: Introduction, Significance, Working of Cyber Security, Challenges,
		Cyber Laws
	Unit 5.2:	Types of cyber-attacks: malware, Phishing, DDoS, Password, Man in the middle, SQL Injections, Prevention from Cyber
	Unit 5.3:	Future Trends in Cyber security: Artificial Intelligence and Machine Learning, Cloud Security, Internet of Things (IoT) Security, Quantum Security, 5G Security.
	Unit 5.4:	Emerging Trends in Digital Media: Influencer Marketing, Omnichannel Marketing, Artificial Intelligence, Deep fake videos, Video Marketing, Metaverse, Chatbots.

Text Books/Resources:

1. Pradeep K. Sinha, "Computer Fundamentals":TB#1
2. E Balagurusamy, "FUNDAMENTALS OF COMPUTERS", Tata McGraw Hill :TB#2
3. M. Morris Mano, "Computer System Architecture":TB#3

Reference Books/Resources

1. https://www.researchgate.net/publication/258339295_FUNDAMENTALS_OF_COMPUTER_STUDIES
2. https://www.geeksforgeeks.org/computer-fundamentals-tutorial/
3. https://www.simplilearn.com/tutorials/cyber-security-tutorial/types-of-cyber-attacks :RB#4
4. https://www.zenarmor.com/docs/network-security-tutorials/future-trends-in-cybersecurity :RB#5
5. https://emeritus.org/in/learn/digital-marketing-trends/:RB#6

SYLLABUS

PROGRAM: BCA SEMESTER: I

Course Code: BCA DSC 02 T	**Credit:03**	**Course: Fundamentals of Programming**	**L:02|T:01|P:00**

No.	Module Description	
Module 1:	**Algorithm, Flow Chart and Programming languages**	
	Unit 1.1:	Introduction of algorithm and flowchart
	Unit 1.2:	Type of software and programming languages
	Unit 1.3:	Introduction to C: Program structure, Per processor
	Unit 1.4:	Derivatives, Header files
	Unit 1.5:	Token, Data Type, Format Specifier, Operators
Module 2:	**Control Statements, Array and String**	
	Unit 2.1:	Control Statements: Definition and types
	Unit 2.2:	Branching, Looping, Jumping Statement and its types
	Unit 2.3:	One dimensional, Two dimensional and Multidimensional Array
	Unit 2.4:	Character Array: Initialization, Reading, writing
	Unit 2.5:	String Manipulation functions
Module 3:	**Function and Pointer**	

	Unit 3.1:	Function: Introduction, types of functions
	Unit 3.2:	Function: Nested function, Recursion
	Unit 3.3:	Passing array as a function parameter
	Unit 3.4:	Pointer and Array: Pointer Expression, pointer with array and string, Array of Pointer
	Unit 3.5:	Pointer and Function: Pointer as function parameter
Module 4:	**Structure and Dynamic Memory Allocation**	
	Unit 4.1:	Array of Structure, Array Within Structure
	Unit 4.2:	Structure within structure
	Unit 4.3:	Structure and Function: Structure as a function parameter
	Unit 4.4:	Memory allocation concept
	Unit 4.5:	Dynamic memory allocation: malloc, calloc, free and realloc
Module 5:	**File Handling**	
	Unit 5.1:	Introduction of file concept: Opening, closing
	Unit 5.2:	Input/output Operation in file
	Unit 5.3:	Error Handling during I/O Operation
	Unit 5.4:	Random Access file

Text Books/Resources:

1. E Balaguru Swami, "ProgramminginANSI", Tata Mc Graw Hills: **TB#1**
2. KR Venu gopal and SRPrasad,"MasteringinC", Tata Mc Graw Hills: **TB#2**

Reference Books/Resources

1. Yashavant Kanetkar,"LetUsC",BPB Publication
2. https://www.javatpoint.com/c-programming-language-tutorial
3. https://www.w3schools.com/c/

SYLLABUS **PROGRAM: BCA SEMESTER: I**			
Course Code: BCA DSC 03 T	**Credit:02**	**Course: Database Management System**	**L:03|T:01|P:00**

No.	Module Description	
Module 1:	**Introduction to Database Management System**	
	Unit 1.1:	Introduction and purpose of database
	Unit 1.2:	View of Data: Data Abstraction, Instances and Schemas, Data Models
	Unit 1.3:	Database Languages: DDL and DML

	Unit 1.4:	Database Architecture: Two-tier, Three-tier
	Unit 1.5:	Database Users and Administrator: Functions and Roles
	Unit 1.6:	Introduction to Data Mining, Data warehouse, Big Data, Data Analytics
Module 2:	**Data Modeling and Database Design**	
	Unit 2.1:	Design Process
	Unit 2.2:	E-R Model
	Unit 2.3:	Constraints
	Unit 2.4:	E-R Diagram
	Unit 2.5:	Weak and Strong Entity Set
Module 3:	**Relational Database Design**	
	Unit 3.1:	Extended E-R Features: Generalization and Specialization
	Unit 3.2:	Constraints on Specialization
	Unit 3.3:	Relational Model Structure
	Unit 3.4:	Database Schema
	Unit 3.5:	Keys: Super, Candidate, Primary, and foreign key
	Unit 3.6:	Schema Diagram
	Unit 3.7:	Conversion of E-R to Relational Model
PRACTICAL MODULE		
Module 4:	**Managing Database and Table**	
	Unit 4.1:	Select, Create and Drop Database
	Unit 4.2:	Create, Rename, Alter Table, Truncate and Drop Table
	Unit 4.3:	Data Types: BIT, BOOLEAN, CHAR, VARCHAR, DATE, DATETIME, DECIMAL
	Unit 4.4:	Insert, Update and Delete Records
	Unit 4.5:	Constraint: Primary Key, Foreign Key, UNIQUE Constraint, NOT NULL Constraint, DEFAULT Constraint, CHECK Constraint
Module 5:	**Spring and Spring Boot Framework**	
	Unit 5.1:	SELECT, ORDER BY, WHERE, SELECT DISTINCT
	Unit 5.2:	Operators: AND, OR, IN, BETWEEN, LIKE, LIMIT, IS NULL
	Unit 5.3:	Numeric, String and Date functions
	Unit 5.4:	Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN, SELF JOIN
	Unit 5.5:	Aggregate F, Functions: GROUP BY, HAVING, MIN (), MAX (), AVG (), SUM (), COUNT ()
	Unit 5.6:	Sub-query

Text Books/Resources:

1. Henry F. Korth, “Database System Concepts”, Tata Mc GrawHills
2. Ivan Bayross, MySQL5.1forProfessionals, SPD

Reference Books/Resources

1. Elmasri and Navathe, “Fundamentals of Database Systems”, Pearson Education.
2. Thomas Connolly and Carolyn Begg, “Database Systems, A Practical Approach to Design Implementation and Management", Pearson Education

3. MySQL Referencehttps://www.mysqltutorial.org/
4. MySQL Reference Manual-https://dev.mysql.com/doc/refman/8.0/en/

SYLLABUS PROGRAM: BCA SEMESTER: I			
Course Code: GE004	**Credit:04**	**Course: GE – I / Fundamentals of Entrepreneurship**	**L:03|T:01|P:00**

No.	Module Description	
Module 1:	**The Entrepreneur**	
	Unit 1.1:	Definitions and Concept of Entrepreneur, Entrepreneurial Traits, Characteristics and Skills
	Unit 1.2:	Classification of Entrepreneurs, Growth and Nature of Entrepreneurs, Importance of Entrepreneurship
	Unit 1.3:	Entrepreneurial Culture, Types of Entrepreneurs, Distinction between Entrepreneur and Manager
Module 2:	**Entrepreneurship Concepts and Women Entrepreneurs**	
	Unit 2.1:	Entrepreneurship: Concept, Theories, and Environmental Factors
	Unit 2.2:	Entrepreneurship Development and Training
	Unit 2.3:	Women Entrepreneurs: Concept, Functions, Growth, Problems Faced
Module 3:	**Project Identification and Appraisal**	
	Unit 3.1:	Project: Concept, Classification, and Search for Business Ideas
	Unit 3.2:	Project Identification, Formulation, and Design
	Unit 3.3:	Project Network Analysis, Report Preparation, and Project Appraisal
Module 4:	**Institutional Finance and Ownership Structures**	
	Unit 4.1:	Institutional Finance: Role of Commercial Banks and Financial Institutions
	Unit 4.2:	Institutional Support for Small Entrepreneurs
	Unit 4.3:	Ownership Structures: Proprietorship, Partnership, Company, Cooperative – Selection Criteria
Module 5:	**Micro, Small & Medium Enterprises (MSME)**	
	Unit 5.1:	Introduction to MSME: Classification and Registration
	Unit 5.2:	Ministry of MSME: Government Policies, Start-up vs. MSME, Major Schemes
	Unit 5.3:	PMEGP: Objectives, Benefits, Applicability; SRI Fund: Structure and Objectives; Steps to Start an MSME; Case Study

Text Books/Resources:

1. The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 6th edition, 2018.

Reference Books/Resources

1. Entrepreneur Development, Satish Taneja, Himalaya Publishing House, 1st edition, 2015.

2. Entrepreneur Development, Dr. S.S. Khanka, S. Chand, 5th Edition, 2012. Entrepreneur
3. Development, Kumar, latest edition, reprint 2003.

SYLLABUS PROGRAM: BCA SEMESTER: I			
Course Code: BCOM DSC 003	**Credit:04**	**Course: GE – I / Business Organization**	**L:03|T:01|P:00**

No.	Module Description	
Module 1:	**Introduction to Business and Organization**	
	Unit 1.1:	Business: Meaning, Nature, Objectives, Social Responsibility
	Unit 1.2:	Essentials of a Successful Business, Functional Areas of Business
	Unit 1.3:	Concept of Business Organization
Module 2:	**Forms of Private Sector Enterprises**	
	Unit 2.1:	Sole Proprietorship: Meaning, Features, Merits and Demerits
	Unit 2.2:	Partnership: Meaning, Features, Merits and Demerits
	Unit 2.3:	Joint Stock Company: Meaning, Features, Merits and Demerits
	Unit 2.4:	Co-operatives: Meaning, Features, Merits and Demerits
Module 3:	**Government Departmental Undertakings**	
	Unit 3.1:	Departmental Undertakings: Meaning, Features, Merits and Demerits
Module 4:	**Other Forms of Public Enterprises**	
	Unit 4.1:	Public Corporations: Meaning, Features, Merits and Demerits
	Unit 4.2:	Government Companies: Meaning, Features, Merits and Demerits
Module 5:	**Business Combinations**	
	Unit 5.1:	Business Combinations: Meaning, Reasons, and Types
	Unit 5.2:	Forms, Merits, and Demerits of Business Combinations
	Unit 5.3:	Recent Trends in Business Combinations

Text Books/ Reference Books:

1. C B. Gupta - Business Organization and Management, Sultan Chand & Sons.
2. Dr. S. C. Saxena - Business Administration & Management, Sahitya Bhawan.
3. M. C. Shukla - Business Organization and Management. S Chand & Company Pvt. Ltd.
4. S.A Sherlekar - Business Organization, Himalaya Publishing House.
5. Y.K. Bhushan. Fundamentals of Business Organization and Management, Sultan Chand & Sons.
6. R.K. Sharma, Business Organization & Management Kalyani Publishers
7. Dr. I.M. Sahai, Dr. Padmakar Asthana,' Business Organization & Administration', Sahitya Bhawan Publications Agra.

SYLLABUS

PROGRAM: BCA SEMESTER: I

Course Code: SEC-001	Credit:02	Course: IT Skills	L:00|T:00|P:02

No.	Module Description	
Module 1:	**Word Processing**	
	Unit 1.1:	Working With Document: Opening, Saving and Editing Files, Inserting, Deleting Files
	Unit 1.2:	Margins: Converting Files to Different Format Using Tools Bar
	Unit 1.3:	Page Style, Alignment -Indents, Line Space, Border and Shading
	Unit 1.4:	Header and Footer Setting
	Unit 1.5:	Drawing: Inserting Clip Arts Pictures/Files Etc.
	Unit 1.6:	Word Completion: Spell Checks
	Unit 1.7:	Mail Merging
Module 2:	**Spread Sheet**	
	Unit 2.1:	Spread Sheet and Its Applications
	Unit 2.2:	Working With Spreadsheet: Opening, Saving, File Setting
	Unit 2.3:	Spreadsheet Addressing: Rows, Columns and Cells, Referring Cells
	Unit 2.4:	Inserting Data: Insert Cells, Columns, Rows and Sheets
	Unit 2.5:	External Files: Frames Clipart, Pictures etc.
	Unit 2.6:	Formula Tab
Module 3:	**Presentation**	
	Unit 3.1:	Introduction To Presentation: Opening New Presentation
	Unit 3.2:	Selecting Presentation Layout
	Unit 3.3:	Adding Text to the Presentation
	Unit 3.4:	Header And Footer
	Unit 3.5:	Slide Layout
	Unit 3.6:	Adding Graphics to the Presentation, Setting Animation and Transition Effect
Module 4:	**HTML Basics**	
	Unit 4.1:	Introduction Of HTML, Elements Of HTML
	Unit 4.2:	Attributes, Headings, Paragraph, Styles Of HTML
	Unit 4.3:	CSS, Tables
	Unit 4.4:	HTML Class, Id
	Unit 4.5:	HTML Responsive
	Unit 4.6:	HTML Forms
Module 5:	**Web Designing**	
	Unit 5.1:	Introduction to Web Designing Tool
	Unit 5.2:	Admin and General Site Settings
	Unit 5.3:	Writing Post and Formatting Text
	Unit 5.4:	Publishing a Post
	Unit 5.5:	Adding Image and Managing Media Library and Creating Links

Text Books/Resources:

1. Top help topics – Microsoft Support
2. https://www.w3schools.com/html/

Reference Books/Resources

1. https://www.tutorialspoint.com/wordpress/index.htm

SYLLABUS PROGRAM: BCA SEMESTER: I			
Course Code: AEC-001	**Credit:02**	**Course: Communication Skill**	**L:01|T:01|P:00**

No.	Module Description	
Module 1:	**Basics of Communication**	
	Unit 1.1:	Communication: An Introduction
	Unit 1.2:	Definition and Scope
	Unit 1.3:	Process of Communication
	Unit 1.4:	Barriers to Communication
	Unit 1.5:	Types of Communication
Module 2:	**Writing Skills**	
	Unit 2.1:	Letter Writing- Formal and Informal
	Unit 2.2:	CV, Email, Message
	Unit 2.3:	Minutes, Report Writing
	Unit 2.4:	Notice, Memoranda
Module 3:	**Reading Skills**	
	Unit 3.1:	Types of Readings
Module 4:	**Listening Skills**	
	Unit 4.1:	Effective listening
	Unit 4.2:	Barriers to listening
Module 5:	**Speaking Skills**	
	Unit 5.1:	Introduction to Soft Skills
	Unit 5.2:	Personality Development
	Unit 5.3:	Time Management/leadership Skills
	Unit 5.4:	Interviews/ Group Discussion/Presentation Skills
	Unit 5.5:	Short Speech

Text Books/Resources:

1. Brown, Ralph: Making Business Writing Happen: A Simple and Effective Guide to Writing Well. Sydney: Allen and Unwin,2004.
2. Buscemi, Santi and Charlotte Smith, 75ReadingsPlus.Second Edition New York: McGraw-Hill,1994.
3. Mohan Krishna C Banerji, Meera: Developing Communication Skills. New Delhi: Macmillan India,1990.

SYLLABUS **PROGRAM: BCA SEMESTER: I**			
Course Code: VAC-001	**Credit:02**	**Course: Yoga and Human Conciseness**	**L:02|T:00|P:00**

No.	Module Description	
Module 1:	**Introduction to Yoga**	
	Unit 1.1:	Meaning and definitions of Yoga
	Unit 1.2:	Importance of Yoga as art, science and philosophy
	Unit 1.3:	Yogic Diet
Module 2:	**Philosophical Perspective of Yoga**	
	Unit 2.1:	Yoga in Bhagavad Gita: Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga
	Unit 2.2:	The 'Yoga Sutras' in general; its significance in life.
	Unit 2.3:	Limbs/parts of yoga (Astanga Yoga) according to the 'Yoga Sutras'
	Unit 2.4:	Concept of Ishwara; Ishwara in Yoga Philosophy
Module 3:	**Yogic Practices for Health & Wellness**	
	Unit 3.1:	Asana, its classification and effects
	Unit 3.2:	Pranayama, its types and effects
	Unit 3.3:	Kriya, Mudra and Bhandha: Procedure and Effects
	Unit 3.4:	Yoga Vs Physical Exercise
Module 4:	**Human Consciousness & Meditation**	
	Unit 4.1:	Meaning & Definition of Human Consciousness.
	Unit 4.2:	Need for Study of Human Consciousness.
	Unit 4.3:	Current Crisis of Human Consciousness & Measures for Meaning full solution.
	Unit 4.4:	The Theory of Meditation- Japa Meditation, Ajapajapa Meditation, Yoga Nindra, Tratak.
Module 5:	**Yoga Practice**	

	Unit 5.1:	**Suryanamskara** – (12 counts) (Practical) **Asana -** 1. **Standing**: -Tada sana, Ardha kati chakras ana, Ardha chakra sana, Trikona sana, Vrikshasana. 2. **Sitting:** - Vajra sana, Padmasana, Goumukhasana, Paschi mottana sana, Shashanka sana. 3. **Lying Supine Position**: - Shavasana, Setu band hasana, Chakra sana, Sarvangasana, Halasana. 4. **Lying Prone Position** - Makarasana, Bhujangasana, Shalabhasana, Dhanurasana, Naukasana.
	Unit 5.2:	**Pranayama:** Nadishodhana, Suryabhedana, Chandrabhedana, Shitali, Bhastrika,Bhramari.
	Unit 5.3:	**Bandh &Mudra:** Jalandharabandha, Uddiyanbandha, Moolabandha,Yogamudra, Viparitkarnimudra, Shambhavimudra
	Unit 5.4:	Dhyana and its forms

Text Books /Reference Books:

1. Holistic Approach of Yoga- G. Shankar: Aditya Publishers
2. Patanjali's YogaSutra– Translation and Commentary- Dr. P.V. Karam belkar Lonavla
3. Guidelines to Yogic Practices – M.L. Gharote: Lonavla
4. Yoga and Indian Philosophy – Karel Werner: Motilal Banarsidass
5. Yoga: The Path to Holistic Health- B.K.S. Iyenger: Dorling Kindersley Limited

Reference Books/Resources

2. Bruce Eckel, "THINKING IN JAVA", PEARSON
3. JDK Release Notes - https://www.oracle.com/java/technologies/javase/jdk- relnotes-index.html
4. JavaFX - https://jenkov.com/tutorials/javafx/index.html

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code: BCA DSC 04 T	Credit:03	Course: Object Oriented Programing Concepts	L:03|T:01|P:00

No.	Module Description	
Module 1:	**Object Oriented Concepts**	
	Unit 1.1:	Features And Structure of C++ Program
	Unit 1.2:	Object Oriented Programming Concepts, Advantage
	Unit 1.3:	Object and Class
	Unit 1.4:	Member Function
	Unit 1.5:	Array within the Class
Module 2:	**Functions, Constructors, Destructors**	
	Unit 2.1:	Memory Allocation of Objects
	Unit 2.2:	Friend Function
	Unit 2.3:	Local Class
	Unit 2.4:	Constructors: Parameterized, Multiple, Default Argument
	Unit 2.5:	Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor
	Unit 2.6:	Destructors
Module 3:	**Operator Overloading and Inheritance**	
	Unit 3.1:	Operator Overloading: Unary and Binary
	Unit 3.2:	Overloading Binary Operators Using Friends
	Unit 3.3:	Rules of Overloading Operators, Type Conversion
	Unit 3.4:	Inheritance, Derived Classes
	Unit 3.5:	Inheritance: Single, Multilevel, Multiple.
	Unit 3.6:	Virtual Base Classes, Abstract Class
	Unit 3.7:	Constructors In Derived Classes, Member Classes
Module 4:	**Pointer, Virtual Function and Polymorphism**	
	Unit 4.1:	Pointers: Pointers To Objects, This Pointer
	Unit 4.2:	Pointer To Derived Classes
	Unit 4.3:	Virtual Function, Pure Virtual Function
	Unit 4.4:	Polymorphism: Compile Time, Run Time
	Unit 4.5:	Overloading and overriding
Module 5:	**Console I/O Operations and File Handling**	
	Unit 5.1:	Stream Classes
	Unit 5.2:	I/O Operations: Unformatted and Formatted
	Unit 5.3:	Managing Output with Manipulators
	Unit 5.4:	Classes For File Stream Operations
	Unit 5.5:	Opening and Closing a File, Detecting End-of-File
	Unit 5.6:	File Modes, File Pointers and Their Manipulations
	Unit 5.7:	Sequential Input and Output Operations
	Unit 5.8:	Random Access File

	Unit 5.9:	Error Handling During File Operations

Text Books/Resources:

1. 1. E. BALAGURUSAMY, “Object Oriented Programming with C++”, Tata McGraw- Hill:

TB#1 Reference Books/Resources

1. Herbert Schildt, “The Complete Reference” Tata Mc Graw-Hill
2. Robert Lafore, “Object Oriented Programming in Turbo C++” The Waite Group
3. Programming in Modern C++ NPTEL SWAYAM:https://onlinecourses.nptel.ac.in/noc23 cs78/previewC++ Tutorialhttps://www.javatpoint.com/cpp-tutorial

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PROGRAM: BCA SEMESTER: II

Course Code: BCA DSC 05 T	**Credit:03**	**Course: Relational Database Management System**	**L:02|T:01|P:00**

No.	Module Description	
Module 1:	**Relational Database Design**	
	Unit 1.1:	E.F. Codd’s Rule
	Unit 1.2:	Functional dependency, Armstrong’s Inference rules
	Unit 1.3:	Decomposition of Relations: Lossless Join and Dependency Preservation Property
	Unit 1.4:	Normalization: First, Second and Third Normal Form
	Unit 1.5:	Denormalization
Module 2:	**Procedural SQL**	
	Unit 2.1:	Compound statements and labels
	Unit 2.2:	Overview of Control and Iterative statements: IF, CASE, LEAVE, WHILE, LOOP
	Unit 2.3:	Cursors: OPEN, CLOSE and FETCH
	Unit 2.4:	User Defined Function: Need, RETURN statement
	Unit 2.5:	Stored Procedure: Need and usage
Module 3:	**Triggers**	
	Unit 3.1:	Triggers and their usage
	Unit 3.2:	Trigger Activation
	Unit 3.3:	BEFORE and AFTER trigger
	Unit 3.4:	COMMIT, ROLLBACK, SAVEPOINT
Module 4:	**Transaction Processing**	
	Unit 4.1:	Transaction: Introduction, Transaction Model
	Unit 4.2:	Properties of Transactions
	Unit 4.3:	Transaction isolation, Schedules: Serial, Non-Serial Schedules
	Unit 4.4:	Serializability, Conflict Serializability
Module 5:	**Concurrency Control**	
	Unit 5.1:	Concurrent Transactions: Purpose

	Unit 5.2:	Concurrency Control Protocol: Two Phase Locking(2PL) Protocol
	Unit 5.3:	Strict 2PL, Conservative 2PL
	Unit 5.4:	Deadlock and Starvation
	Unit 5.5:	Deadlock Detection and Resolution: Wait-for graph

Text Books/Resources:

1. Henry F. Korth, "Database System Concepts", Tata McGrawHills
2. Ivan Bayross, MySQL5.1forProfessionals, SPD

Reference Books/Resources

1. Elmasri and Navathe, "Fundamentals of Database Systems",PearsonEducation.
2. Thomas Connolly and Carolyn Begg, "Database Systems, A Practical Approach to Design Implementation and Management", Pearson Education
3. MySQL Referencehttps://www.mysqltutorial.org/
4. MySQL Reference Manual -https://dev.mysql.com/doc/refman/8.0/en/

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code: BCA DSC 06	**Credit:02**	**Course: Operating System Concepts**	**L:02|T:00|P:00**

No.	Module Description	
Module 1:	**Definition to Operating System**	
	Unit 1.1:	Definition and function of an operating system
	Unit 1.2:	Types of operating system: batch, time-sharing, real-time, distributed, embedded
	Unit 1.3:	System call and interface
	Unit 1.4:	The role of OS in a computing environment
	Unit 1.5:	OS structure: Monolithic, microkernel, hybrid architectures
Module 2:	**Operating System Services**	
	Unit 2.1:	Process management and scheduling
	Unit 2.2:	Memory management
	Unit 2.3:	File systems
	Unit 2.4:	I/O management
	Unit 2.5:	Device drivers
	Unit 2.6:	Security and protections
Module 3:	**Processes and Threads**	
	Unit 3.1:	Concept of processes, threads, and programs
	Unit 3.2:	Process state model
	Unit 3.3:	Process scheduling and CPU scheduling algorithms
	Unit 3.4:	Context switching

	Unit 3.5:	Threads: user vs kernal threads, thread libraries
Module 4:	**Linux OS**	
	Unit 4.1:	Introduction to Linux
	Unit 4.2:	Linux File System & Directory Structure
	Unit 4.3:	Linux commands: Basic Linux Commands, User & Group Management, Process Management
	Unit 4.4:	Shell scripting: Basics of Shell Scripting, Variables, Loops, and Conditional Statements, Creating and Executing Scripts
	Unit 4.5:	VI Editor

Text Books/Resources:

1. Abraham Silberschatz, Peter B Galvin, and Gerg Gagne – "Operating System Concepts", Wiley.

SYLLABUS **PROGRAM: BCA SEMESTER: II**			
Course Code: GE007	**Credit:04**	**Course: GE-II / Chhattisgarh ki Jan Jatiya Sanskriti**	**L:02|T:01|P:00**

अनुक्रमणिका

माड्यूल	**णिषय**	
माड्यूल – 1	**छत्तीसगढ़ की जनजाणियाँ**	
	इकाई - 1	• परिभाषा • विशेषताएँ
	इकाई - 2	• प्रमुख जनजावतय ेकनाम • कला औ सोंस्कृवत
	इकाई - 3	• छत्तीसगढ़ ाज्य में अनुसूवित जनजावतय ेकी सूी • जनजातीय विकास एिं सिकाी य जनाएँ
माड्यूल -2	**जनजाीय णिकास**	
	इकाई - 4	• जनजातीय विकास ेकमुख्य पहलू • जनजातीय विकास में f नौवतय े
	इकाई - 5	• जनजातीय विकास ेकवलए नीवतय ेऔ काययक्रम • छत्तीसगढ़ में जनजातीय विकास
	इकाई - 6	• औद्य वगकीकिण औ शहीकिण का जनजातीय समाज पि प्रभाि • जनजातीय समाज ेकसोंिक्षण औ सोंिर्यन की य जनाएँ
माड्यूल -3	**जनजाीय सामाणजक संगठन**	
	इकाई - 7	• जनजातीय सामावजक सोंगठन का महत्व
	इकाई - 8	• जनजातीय समाज की सोंिना औ पारिारिक व्यिस्था, • छत्तीसगढ़ में जनजातीय मवहलाओों की स्थवत औ उनकी भूवमका
	इकाई - 9	• जनजावतय ेमें अोंतजायतीय औ अोंतिजातीय सोंबोंर्

माड्यूल 4	**छत्तीसगढ़ केआभूषि, ि◌ाद्ययंत्र व्यंजन**	
	इकाई - 10	• आभूषण का सामान्य परि◌िय • प्रमुख जनजातीय आभूषण
	इकाई - 11	• छत्तीसगढ़ केप्रमुख जनजातीय ि◌ाद्ययोंत्र
	इकाई - 12	• छत्तीसगढ़ का पाि◌ोंं परिक भ जन औ व्योंजन • त्य हाि◌ से जुडे विशेष व्योंजन
माड्यूल - 5	**छत्तीसगढ़ की लोककला एि संस्कृणि**	
	इकाई - 13	• छत्तीसगढ़ का जनजातीय हस्तवशल्प एक विस्तृत परि◌िय • छत्तीसगढ़ की पाि◌ोंं परिक ि◌ेशभूषा
	इकाई - 14	• छत्तीसगढ़ केल कगीत कहावनयाँ औ मौस्खक पिंपिाएँ • आर्ुवनक समय में जनजातीय सोंस्कृवत पि पडता प्रभाि◌

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code:	**Credit:04**	**Course: GE-II / Intellectual Property Rights**	**L:02|T:01|P:00**

No.	Module Description	
Module 1:	**Introduction to IPR and Global Organizations**	
	Unit 1.1:	History of IPR in India, Introduction to Intellectual Property, Types and Forms of IPR
	Unit 1.2:	Protection of IPR, Benefits and Problems of IPR
	Unit 1.3:	WTO, GATT, TRIPS, WIPO – Role and Significance
Module 2:	**Indian Patent System and Plant Rights**	
	Unit 2.1:	History of Indian Patent Law, Authorities, Requirements, Types, Patentable and Non-Patentable Items
	Unit 2.2:	Patent Filing Procedures and Patents in India
	Unit 2.3:	Plant Breeder's Right (PBR): Requirements, Farmer's Rights, Advantages, ITPGRFA
Module 3:	**Patents in Biotechnology**	
	Unit 3.1:	Patents for Living Organisms and Biological Materials
	Unit 3.2:	Importance of Patents in Biology and Biotechnology
	Unit 3.3:	Social Issues and Controversies Related to Biological Patents
Module 4:	**Bioethics and Cloning**	
	Unit 4.1:	Introduction to Bioethics, Relation with Other Fields, Applications
	Unit 4.2:	GM Foods and Crops: Health Outcomes and Regulations
	Unit 4.3:	Animal and Human Cloning: Types, Applications, Ethical and Legal Aspects
Module 5:	**Clinical Trials, Biosafety & Regulations**	
	Unit 5.1:	Clinical Trials: Benefits, Risks, Ethical Concerns in Human Participation
	Unit 5.2:	Human Genome Project: Ethical Implications
	Unit 5.3:	Biosafety: Applications, Levels, Guidelines, Hazardous Material Handling, GLP & GMP

Text Books/Resources:

1. Bioethics and Biosafety: M K Satheesh
2. Biotechnology and Patent Protection: Beier FK, Crespi RS and Straus
3. Intellectual Property Rights on Biotechnology: Singh K
4. Biotechnology Expanding Horizons: B D Singh
5. Textbook of Biotechnology: R C Dubey
6. Bioethics and Biosafety: M K Satheesh
7. A Textbook of biotechnology: R C Dubey
8. Biotechnology: Expanding Horizons: B D Singh.
9. Regulatory Framework for GMOs in India: Ministry of Environment and Forest, Govt. of India
10. Cartagena Protocol on Biosafety: Ministry of Environment and Forest, Govt. of Inida
11. Bioethics: Shaleesha A Stanley

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code: SEC 002	Credit:02	Course: Web Designing	L:03|T:01|P:00

No.	Module Description	
Module 1:	**Introduction to Web Design**	
	Unit 1.1:	WWW, Working of Websites
	Unit 1.2:	Web designing process, UX AND UI
	Unit 1.3:	Front End, Back End, Client and Server Scripting Languages
	Unit 1.4:	Responsive Web Designing
	Unit 1.5:	Types of Websites (Static and Dynamic Websites)
Module 2:	**HTML Concepts**	
	Unit 2.1:	Introduction to HTML, HTML Editor, HTML Basics
	Unit 2.2:	HTML Elements and Attributes
	Unit 2.3:	Heading, Types of Heading, Paragraphs, Style
	Unit 2.4:	Formation, Quotations, Comments
	Unit 2.5:	Links, Colors, Images
	Unit 2.6:	List, Tables
	Unit 2.7:	Forms, Form Elements, Input types, Text Input, Text Area, Dropdown, Radio buttons, Checkboxes, Submit and Reset Buttons.
Module 3:	**CSS Concepts**	
	Unit 3.1:	Introduction to CSS, Types of CSS
	Unit 3.2:	Selectors, Comments, Colors
	Unit 3.3:	Background, Borders, Margins, Padding, Height/Width
	Unit 3.4:	Box Model, Outline, Text, Fonts, Icons
	Unit 3.5:	Link, Lists, Tables, Displays
	Unit 3.6:	Positions, Overflow, Float, inline-block
	Unit 3.7:	CSS Menu Design CSS Image Gallery
Module 4:	**Web Publishing and Browsing**	
	Unit 4.1:	Overview, SGML (Standard Generalized Markup Language)

	Unit 4.2:	Web hosting Basics, Components of Web Publishing
	Unit 4.3:	Web Page Design Considerations and Principles
	Unit 4.4:	Search and Meta Search Engines
	Unit 4.5:	WWW, Browser, HTTP, Publishing Tools

Text Books/Resources:

1. Ivan Byross,"Web Enabled Commercial Application Development Using. HTML, JavaScript, DHTML and PHP", BPB Publication#TB1
2. https://www.w3schools.com/
3. https://www.tutorialspoint.com/index.htm

Reference Books/Resources

1. DT Editorial,"Web Technology: Black Book", dreamteach
2. ThomasA. Powell, "The Complete Reference HTML & CSS", McGraw Hill

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code: AEC 002	**Credit:02**	**Course: Professional Communication Skill**	**L:02|T:01|P:00**

No.	Module Description	
Module 1:	**INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION**	
	Unit 1.1:	Listening –for general information-specific details- conversation: Introduction to classmates - Audio/ video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form
	Unit 1.2:	Speaking - Self Introduction; Introducing a friend; Conversation- politeness strategies; Telephone conversation; Leave a voicemail; Leave a message with another person; asking for information to fill details in a form.
	Unit 1.3:	Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails.
	Unit 1.4:	Writing - Writing emails / letters introducing oneself
	Unit 1.5:	Grammar - Present Tense (simple and progressive); Question types: What / Yes or No/ and Tags
	Unit 1.6:	Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).
Module 2:	**NARRATION AND SUMMATION**	
	Unit 2.1:	Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities.
	Unit 2.2:	Narrating personal experiences / events; Interviewing a celebrity; Reporting / and summarizing documentaries / podcasts/ interviews.
	Unit 2.3:	Reading biographies, travelogues, newspaper reports, Excerpts from literature,
		travel & technical blogs.
	Unit 2.4:	Guided writing-- Paragraph writing Short Report on an event (field trip etc.)
	Unit 2.5:	Past tense (simple); Subject-Verb Agreement; and Prepositions
	Unit 2.6:	Word forms (prefixes & suffixes); Synonyms and Antonyms. Phrasal verbs
Module 3:	**DESCRIPTION OF A PROCESS / PRODUCT**	
	Unit 3.1:	Listen to product and process descriptions; a classroom lecture; and advertisements about products.

	Unit 3.2:	Picture description; giving instruction to use the product; Presenting a product; and summarizing a lecture.
	Unit 3.3:	Reading advertisements, gadget reviews; user manuals.
	Unit 3.4:	Writing definitions; instructions; and Product /Process description.
	Unit 3.5:	Compound Nouns, Homonyms; and Homophone
Module 4:	**CLASSIFICATION AND RECOMMENDATIONS**	
	Unit 4.1:	Listening to TED Talks; Scientific lectures; and educational videos.
	Unit 4.2:	Small Talk; Mini presentations and making recommendations.
	Unit 4.3:	Reading –Newspaper articles; Journal reports –and Non-Verbal Communication (tables, pie charts etc,)
	Unit 4.4:	Writing–Note-making/Note-taking
	Unit 4.5:	Grammar –Articles; Pronouns - Possessive & Relative pronouns.
	Unit 4.6:	Vocabulary - Collocations; Fixed / Semi fixed expressions.
Module 5:	**EXPRESSION**	
	Unit 5.1:	Listening to debates/ discussions; different viewpoints on an issue; and panel discussions
	Unit 5.2:	Speaking –group discussions, Debates, and Expressing opinions through Simulations & Role play.
	Unit 5.3:	Reading –Reading editorials; and Opinion Blogs;
	Unit 5.4:	Writing –Essay Writing (Descriptive or narrative).
	Unit 5.5:	Grammar –Future Tenses, Punctuation; Negation (Statements & Questions); Simple, Compound & Complex
	Unit 5.6:	Vocabulary- Cause & Effect Expressions– Contents Function words.

Text Books/Resources:

1. English for Engineers & Technologists Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition)
2. English for Science & Technology Cambridge University Press, 2021.
3. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr.KN.
4. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

Reference Books/Resources

1. Technical Communication– Principles and Practices by Meenakshi Raman &Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book on Technical English By Lakshmi Narayanan, Scitech Publications (India) Pvt. Ltd.
3. English For Technical Communication (With CD) By Aysha Viswamohan, McgrawHill Education, ISBN :0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna PublishingHouse.
5. Learning to Communicate – Dr. V. Chellammal,Allied Publishing House, NewDelhi,2003.

SYLLABUS

PROGRAM: BCA SEMESTER: II

Course Code: VAC 002	Credit:02	Course: Environmental Studies and Disaster management	L:02|T:01|P:00

No.	Module Description	
Module 1:	**Environment**	
	Unit 1.1:	The Atmosphere, Lithosphere, Hydrosphere
	Unit 1.2:	Ecosystem: Energy flow in the ecosystem
	Unit 1.3:	Water Cycle, Carbon Cycle, Nitrogen Cycle
	Unit 1.4:	Environmental Laws
	Unit 1.5:	Water Pollution, Air Pollution, Soil Pollution, Industrial Pollution, Light Pollution, Sound Pollution.
Module 2:	**Climate Change & Sustainable Development**	
	Unit 2.1:	Population Ecology
	Unit 2.2:	Climate Change: Cause, Effect, Global Warming
	Unit 2.3:	Environmental protection: Step taken towards Sustainable Development
	Unit 2.4:	Promotion of Electrical Vehicles
	Unit 2.5:	Brief idea on Sustainable Development Goals (SDGs)
	Unit 2.6:	Carbon Footprint and environmental protection
Module 3:	**Disaster Management**	
	Unit 3.1:	Disaster Management: Types of Disasters
	Unit 3.2:	Vulnerability Assessment and Risk Analysis
	Unit 3.3:	Institutional Framework
	Unit 3.4:	National Disaster Management Authority (NDMA)
	Unit 3.5:	Chhattisgarh State Disaster Management Authority (CSDMA)
	Unit 3.6:	District Disaster Management Plan-(DDMP) Raipur
	Unit 3.7:	Preparedness Measure and Survival skills adopted during and after disaster.
Module 4:	**Public Health Management**	
	Unit 4.1:	Epidemics and Pandemics Non-Communicable Diseases
	Unit 4.2:	Communicable Diseases with special reference to Covid- 19, Flu, Hepatitis, AIDS and Tuberculosis
	Unit 4.3:	Control Measures (Surveillance, Isolation, Contact Tracing)
	Unit 4.4:	Incubation Period
	Unit 4.5:	Life Style Management

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: BCA DSC 07T	Credit: 03	Course: DATA STRUCTURE	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**Introduction to Data Structure**	
	1.1	Introduction - Definition, Classification of data structure.
	1.2	Description of various data structure - Array, Link list, Queue, Stack, Tree and Graph.
	1.3	C++ memory map, Memory allocation operator - New, delete.
	1.4	Performance Analysis &Management-Space complexity, time complexity.
2	**Array**	
	2.1	Introduction, one dimensional array Initialization, Accessing, Implement, Passing array to function.
	2.2	Operation on one dimensional array - insert, delete, traversing and merging elements of array.
	2.3	Dimensional arrays: Initialization, Accessing, Implement.
3	**Stack**	
	3.1	Introduction, operation on stacks.
	3.2	Application of stacks-stack frames, revers in gastring, calculating of post-fix expression and notation conversion.
	3.3	Algorithm for converting infixt opost- fix form, evaluation of post fixes expression.
	3.4	Queue - Introduction, operation on queue.
	3.5	Algorithm for insertion and deletion in queue using array.
4	**Link list**	
	4.1	Introduction, types of link list - single, double and circular link list.
	4.2	Operations on link list-insert, delete and a new node specific position
	4.3	Sorting types-bubble sort, selection sort, insertion sort, quick sort.
	4.4	Searching of array elements - linear searching, binary searching
5	**Tree and Graph**	
	5.1	Introduction - Tree and Graph.
	5.2	Types of Binary Tree-complete binary tree and extended binary tree.
	5.3	Graph introduction, graph traversal - breath first search, depth first search.

Text Books/Resources:

1. Michae lT. Goodrich, Roberto Tamassia, David M. Mount, "Data Structure and Algorithm", John Wiley &Sons
2. SeymourLipschutz,"DataStructures", Mc Graw Hill Education
3. AlfredV.Aho,JohnE.Hopcroft,JeffryD.Ullaman"DataStructure and Algorithms", PearsonEducation
4. ThomasHCoreman,"Introductiontoalgorithms",MITPress
5. https://www.javatpoint.com/data-structure-introduction https://www.geeksforgeeks.org/data-structures/

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: BCA DSC 08 T	Credit:03	Course: Java Programming	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**Introduction to java**	
	1.2	Structure of java program, Compilation and execution of Java program
	1.3	Data types and variables, Operators (Arithmetic, Relational, Logical, Assignment)
	1.4	Control statements (if, switch, for, while, do-while)
	1.5	Arrays (single and multi-dimensional)
	1.1	Overview of Java, Features of java
2	**Object Oriented Programming Concepts**	
	2.1	Classes and Objects
	2.2	Constructors, Methods (overloading and overriding)
	2.3	Inheritance (single, multi-level, and hierarchical inheritance)
	2.4	Polymorphism, Encapsulation (getter and setter methods)
	2.5	Abstraction (abstract classes and interfaces
	2.6	This keyword, super keyword
3	**String Handling, Exception Handling**	
	3.1	String class and methods
	3.2	String Buffer and StringBuilder
	3.3	Types of exceptions (Checked and Unchecked)
	3.4	try, catch, finally blocks
	3.5	throw and throws
4	**Java Input/Output (I/O), Multithreading**	
	4.1	File handling (File Reader, File Writer, Buffered Reader, Buffered Writer)
	4.2	Input Stream and Output Stream classes
	4.3	Object serialization and deserialization
	4.4	Thread life cycle
	4.5	Creating threads (extending Thread class, implementing Runnable interface)
5		
	5.1	Runtime Environment and Storage Organization: Activation records, Stack allocation, heap allocation, Parameter passing mechanisms
	5.2	Code Generation Techniques: Instruction selection and addressing, Register allocation and spilling, Target machine considerations
	5.3	**Compiler Tools and Final Project:** Using Lex and Yacc/Bison, Building a simple compiler front-end
	5.4	CRUD operations (Create, Read, Update, Delete)
	5.5	Prepared Statement and Statement

Text Books/Resources:

1. HerbertSchildt,*"Java:TheCompleteReference"*,McGrawHill.
E.Balagurusamy,*"ProgrammingwithJava"*,McGrawHill.

REFERENCE BOOKS:

1. CayS.Horstmann,*"CoreJavaVolumeI-Fundamentals"*,PearsonEducation.
2. Joshua Bloch, *"Effective Java"*,Addison-Wesley. Kathy Sierra and Bert Bates, *"Head First Java"*,O'ReillyMedia.

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: BCA SEC 003	Credit: 02	Course: Python Programing	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**Python Basics**	
	1.1	Python Syntax and Basic Operations
	1.2	Variables, Data Types (Numbers, Strings, Lists, Tuples, Sets, Dictionaries)
	1.3	Functions: Built-in and User-defined Function Arguments (Default, Keyword, Arbitrary) Return Values Recursion
	1.4	Exception Handling (try-except-finally)
	1.5	Constructor (init method)
	1.6	File Handling (Reading & Writing Files, Modes, with statement)
2	**Data Handling & Libraries**	
	2.1	Working with Lists, Tuples, Sets, and Dictionaries
	2.2	String Manipulation
	2.3	Introduction to NumPy: Arrays, Operations, Indexing & Slicing
	2.4	Introduction to Pandas: Series, Data Frames, Basic Operations
	2.5	Matplotlib: Data Visualization Basics (Line Plot, Bar Chart, Scatter Plot)
3	**Database and GUI**	
	3.1	Introduction to MySQL and SQLite
	3.2	CRUD Operations using Python (sqlite3 and mysql.connector)
	3.3	Introduction to Tkinter
	3.4	Basic Widgets (Button, Label, Entry, Frame, Menu)
	3.5	Event Handling

Text Books/Resources:

1. **Think Python** – *Allen B.Downey*
2. **"Core Python Programming"** – Dr. R. NageswaraRao

Reference Books/Resources

1. **"Learning Python"** – MarkLutz
2. **"Python Crash Course"** – EricMatthes
3. https://www.geeksforgeeks.org/python-programming-language-tutorial/

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: BCA DSC 09	Credit: 02	Course: Software Engineering	L: |T: |P:

No.	Module Description	
1	**Introduction to Software Engineering, Methodology and Life Cycle**	
	1.1	Software Engineering Definition, Program vs Software, Characteristics of Software
	1.2	Software Engineering Principles
	1.3	Object-Oriented Basic Concepts: Classes and Object, Messages and Attributes, Encapsulation, Inheritance, Polymorphism, Responsibility and Abstraction, Object Composition
	1.4	Object-Oriented Methodologies: Coad and Yourdon, Booch, Rumbaugh
	1.5	Software Life Cycle Models: Waterfall, Prototyping, Iterative Enhancement, Spiral
	1.6	Agile Process Models: Introduction, Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method
	1.7	Selection of Software Development Life Cycle Models
2	**Software Requirement Elicitation and Analysis**	
	2.1	Software Requirement: Need, Identification of Stakeholders, Functional and Non-functional Requirement
	2.2	Requirements Elicitation Techniques: FAST, Prototyping
	2.3	Initial Requirement Document
	2.4	Use Case Approach: Use Cases and Actors, Identification of Actors, Identification of Use Cases, Defining Relationship between Use Case Diagram, Use Case Description
	2.5	Characteristics of Good Requirement
	2.6	Software Requirement Specification Document: Nature and Organization of the SRS Document
3	**Object-Oriented Analysis**	
	3.1	Structured Analysis vs. Object-Oriented Analysis
	3.2	Identification of Classes: Entity, Interface, Control
	3.3	Identification of Relationships: Association, Aggregation, Multiplicity, Composition, Dependency, Generalization, Modelling Relationships
	3.4	Identifying State and Behavior: Attributes, Operations
	3.5	Class Diagrams
	3.6	A Case Study
4	**Object-Oriented Design and Implementation**	
	4.1	Need of Object-Oriented Design Phase
	4.2	Interaction Diagrams: Sequence
	4.3	Activity Diagrams
	4.4	State Chart Diagrams
	4.5	Object-Oriented Design Principles for Improving Software Quality
	4.6	Implementing the Classes: Good Programming Practices, Coding Standards, Refactoring, Reusability
5	**Software Quality and Testing**	
	5.1	Software Quality and its attributes
	5.2	Software Testing: Verification, Validation
	5.3	Software Verification Techniques and Tool

Text Books/Resources: Yogesh Singh, Ruchika Malhotra, "Object-Oriented Software Engineering",PHI.

1. **Reference Books/Resources** RogerS. Pressman, "SoftwareEngineering–APractitioner'sApproach",7thEdition, TATA McGraw-Hill.

2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education.

3. MichaelR.Blaha, JamesR. Rumbaugh,"Object-OrientedModelingandDesignwith UML", 2nd Edition,Pearson.

Rajib Mall, "Fundamentals of Software Engineering", 4th Edition,PHI.

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: BCA DSE 003	Credit:02	Course: VEDIC MATHEMATICS	L:03|T:01|P:00

No.	Module Description	
1	**Fundamentals of Vedic Arithmetic**	
	1.1	Addition - Completing the Whole
	1.2	Addition from Left to Right
	1.3	Addition of List of Numbers - Shudh Method
	1.4	Subtraction - Base Method
	1.5	Subtraction - Completing the Whole
	1.6	Subtraction from Left to Right
2	**Mastering Digit Sums and Check Methods**	
	2.1	Digit Sums, Casting Out 9s, 9-Check
	2.2	11-Check Method
3	**Special Multiplication Techniques**	
	3.1	Base and Sub Base Methods
	3.2	Vinculum Technique
	3.3	Multiplication of Complementary Numbers
	3.4	Multiplication by Numbers with All 9s
	3.5	Multiplication by 11
	3.6	Two-Digit Multiplication (RTL)
	3.7	Three & Four-Digit Multiplication (RTL)
4	**Squaring and Square Roots**	
	4.1	Squaring Numbers Ending in 5
	4.2	Squaring Decimals and Fractions
	4.3	Squaring Numbers Near 50
	4.4	Squaring Near Base and Sub Base
	4.5	General Squaring (Left to Right)
	4.6	Splitting Numbers for Simplified Squares
	4.7	Algebraic Squaring
	4.8	Reverse Squaring (Find Square Root)
	4.9	Square Root of Perfect Squares
	4.10	General Square Root Method

5	**Division Techniques**	
	5.1	Special Division Methods
	5.2	Straight Division
Text Books/Resources: *Vedic Mathematics* by Bharati Krishna Tirthaji Maharaj		
The Trachtenberg Speed System of Basic Mathematics by Jakow Trachtenberg		
vedicmaths.org		
gurukul.org/vedic-maths		

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PROGRAM: BCA SEMESTER: III

Course Code: AEC 003	**Credit:02**	**Course: PRESENTATION SKILLS**	**L:03|T:01|P:00**

No.	**Module Description**	
1	Preparation of presentation	
	1.1	1st part – what, how, for whom, structure, principles and presentation technique, business presentation specifications
	1.2	Report Writing, Developing Effective Presentation Skills.
	1.3	Oral Presentation: Principles of oral presentation, factors affecting presentation, sales presentation, training presentation, conducting surveys, speeches to motivate, effective presentation skills
	1.4	Slide Presentation: Craft your message, make a visual, Include proper Content of your presentation.
2	Verbal communication	
	2.1	jawbreakers, argumentation, usable and unsuitable phrases Communication skills – listening, empathic reaction, how to question, stealing the show
	2.2	opening door question Conflict situation solving, attack from the audience – communication skills as a work experience, vicious circle of attack and defense.
	2.3	Nonverbal communication during presentation – how to manage stress, what to do with hands, legs, activating the audience with nonverbal communication, body language.
3	Work with audience	
	3.1	ice-breaking, get them in the mood
	3.2	work with emotions, visualization tools
	3.3	nonstandard situations Improvisation and unprepared presentations Personal
		typology
	3.4	professional typology, social aspect, man-woman view.
4	Feedback	
	4.1	appreciation and critique
	4.2	Paradigm of human cooperation
	4.3	why there could be problems to start the communication and what to do with it
	4.4	Defense against manipulation, how to say NO, stress management, Image and etiquette.

Text Books/Resources: Effective Presentation Skills – Robert Dilts, Meta Publication
2. Business Communication Today - Bovee and Thill: Tata McGraw Hill,
3. Presentation Skills 2011

SYLLABUS

PROGRAM: BCA SEMESTER: III

Course Code: GE021	Credit:04	Course: Organizational Behavior	L:03|T:01|P:00

No.	Module Description	
1	**Focus and Purpose**	
	1.1	Definition; need and importance of Organizational Behavior
	1.2	Nature and scope; Framework - Organizational Behavior Models
2	**Individual Behavior**	
	2.1	Personality; Types; Factors influencing personality; Theories, The Learning Process
	2.2	Learning Theories Organizational Behavior
	2.3	Modification. Attitudes - Characteristics - Components - formation – measurement. Perception - Importance - Factors influencing perception - Interpersonal perception.
3	**Group Behavior**	
	3.1	Organization Structure - Formation- Groups in Organizations
	3.2	Influence - Group Dynamics - Emergence of informal leaders
	3.3	working norms- Group Decision Making Techniques interpersonal relations -
		Communication - Control.
4	**Leadership and Power**	
	4.1	Meaning – Importance- Leadership styles – Theories- Leaders vs Managers - Sources of Power - Power Centers -Power and Politics.
	4.2	Sources of Power - Power Centers -Power and Politics.

1. **Text Books/Resources:** Stephen P. Robbins, *"Prentice Hall of India"* 9th Edition, 2001.
2. Hellriegel, Slocum and Woodman**,** *"Organisational Behavior"* South-Western, Thomson Learning, 9th edition, 2001.
3. Schermerhorn, Hunt and Osborn, *"Organisational Behavior"* John Wiley, 7th edition, 2001.
4. "***Organisational Behavior"***, Jit S.Chand, Vikas Publishing House Pvt. Ltd, 2nd edition, 2001.
5. Fred Luthans, "***Organisational Behavior"***, McGraw-Hill Book Co., 1998.
6. New Strom and Davis, "***Organisational Behaviour"***, McGraw-Hill, 2001.

Jeff Harris and Sandra Hartman, "***Organisational Behaviour"***, Jaico, 2002

SYLLABUS

PROGRAM: BBA SEMESTER: III

Course Code: GE016	Credit:04	Course: Managerial Economics	L:03|T:01|P:00

No.	Module Description	
1	Nature and Scope of Business Economics	
	1.1	Micro and Macro Economics, Basic Economic Problems.
	1.2	Demand, Supply and Market Equilibrium: Individual Demand,
	1.3	Elasticity of Demand, Law of Supply and Market Equilibrium.
2	Theory Of Consumer Behavior	
	2.1	Cardinal Utility Theory, Ordinal Utility Theory- Indifference Curves, Budget Line
	2.2	Consumer Choice, Inferior and Giffen Goods
	2.3	Law of Diminishing Margin Utility.
3	National Income	
	3.1	Concepts, Definition, Methods of Measurement, National Income in India
	3.2	Problems in Measurement of National Income &; Precautions in Estimation of National Income

Text Books/Resources: Managerial Economics Theory and Applyings, D.N Dwivedi, Vikas Publishing House, 8thEdition. 2016.

1. Principles of Economics, Deviga Vengedasalam, Karunaagarn Madhavan, Oxford University Press, Reprint 2018.
2. Managerial Economics, Geetika and Piyali Ghosh, Tata McGraw Hill, 3rdEdition 2017.
3. Managerial Economics Principles and World-wide Applying (MEPWA), Dominick Salvatore and Siddhartha K. Rastogi, Oxford University Press,8th Edition, 2016.
4. Managerial Economics Theory and Applyings, Dr.D.M Mithani, Himalaya Publishing House, 2013.
5. Economics, Paul A Samuelson, William D Nordhaus, McGraw-Hill Publication, 20 th edition.

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: BCA DSC10	Credit: 03	Course: WEB TECHNOLOGY	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**HTML**	
	1.1	Introduction to HTML – Structure, Elements, and Syntax
	1.2	Text Formatting and Semantic Tags in HTML
	1.3	IFRAME and File Path Handling in HTML
	1.4	Tables and Lists – Creation and Customization
	1.5	HTML Forms – Input Types, Attributes, and Validation
	1.6	HTML Layout – Head, ID, Class, and CSS Integration
	1.7	Advanced HTML Concepts: Events, SVG, Canvas, URL Handling, and APIs in HTML5
2	**CSS**	
	2.1	Introduction to CSS – Purpose, Types, and Application
	2.2	CSS Selectors – Basic, Advanced, and Pseudo Selectors
	2.3	CSS Specificity and Inheritance
	2.4	Background and Border Properties
	2.5	Display and Positioning – Static, Relative, Absolute, Fixed
	2.6	Width, Height, and Overflow Properties
	2.7	List Styles and calc() Function
	2.8	Visibility and Print-Specific CSS
	2.9	Cursor and Button Styling
	2.10	Advanced CSS Topics: Images, Colors, Gradients, Shadows, Fonts, Transformations, Animations, and Z-Index
	2.11	Responsive Web Design – CSS Media Queries
3	**JAVASCRIPT**	
	3.1	Introduction to JavaScript – Basics, Data Types, and Variables
	3.2	JavaScript Scripting – Functions, Loops, and Control Structures
	3.3	JavaScript Objects and DOM Manipulation
	3.4	Event Handling and Form Validation
	3.5	JavaScript ES6 Features – Let, Const, Arrow Functions, Promises
	3.6	Introduction to AJAX and JSON
4	**PHP**	
	4.1	Introduction to PHP – Syntax, Variables, and Data Types
	4.2	PHP and MySQL – Database Connectivity and CRUD Operations
	4.3	PHP Form Handling – GET, POST, Sessions, and Cookies
	4.4	PHP File Handling – Reading, Writing, and Uploading Files
	4.5	Error Handling and Exception Management in PHP
	4.6	PHP Security – SQL Injection, XSS Prevention
	4.7	PHP Frameworks Overview – Laravel, CodeIgniter
	4.8	Caching and Performance Optimization in PHP
5	**API, GIT AND GITHUB**	
	5.1	Introduction to APIs – RESTful APIs, HTTP Methods

	5.2	Fetch API and Axios – Making API Requests
	5.3	Introduction to Git – Version Control Basics
	5.4	GitHub – Repositories, Branching, Merging
	5.5	Git Workflow – Cloning, Pull Requests, Conflict Resolution
	5.6	Introduction to GitHub Actions – CI/CD Basics

Text Books/Resources:

1. **"Web Development and Design Foundations with HTML5"** – *Terry Felke-Morris*
2. "HTML5: The Missing Manual" – Matthew MacDonald
3. "Mastering CSS: Advanced Web Design Techniques" – Ben Frain
4. "JavaScript: The Definitive Guide" – David Flanagan
5. "Programming PHP" – Kevin Tatroe, Rasmus Lerdorf & Peter MacIntyre
6. **"Programming in PHP"** – *T. V. Suresh Kumar, B. Easwar Reddy & P. R. Kumar*

"Mastering Git and GitHub" – *Ankit Jain & Anubhav Srivastava*

Reference Books/Resources

1. **"Version Control with Git"** – *Jon Loeliger & Matthew McCullough*
2. **"PHP and MySQL Web Development"** – *Luke Welling & Laura Thomson*
3. J2EE Architecture – B V Kumar, S Sangeetha, S V Subrahmanya. **TB#3**

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: BCA DSC11T	Credit:03	Course: Data Warehousing and Data Mining	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**Introduction to Data Mining**	
	1.2	Introduction to Data Science: Data mining, Machine Learning, Deep Learning, Artificial Intelligence, Data Warehouse, Big Data
	1.3	Data Mining, Knowledge Discovery from Data (KDD) Framework
	1.4	Types of data for Data Mining
	1.5	Data Mining: Confluence of multiple disciplines
2	**Data Preprocessing**	
	2.1	Data types: Nominal attributes, Binary attributes, Ordinal attributes
	2.2	Statistics of data: Central tendency, dispersion of data - Range, quartiles, Variance and standard deviation
	2.3	Covariance and correlation analysis
	2.4	Data quality, Data cleaning: Missing values, Noisy data, Data integration
	2.5	Data transformation: Normalization, Discretization
3	**Data warehousing and Online Analytical Processing**	
	3.1	Introduction to Data Warehouse

	3.2	Data Warehouses Architecture: The three-tier architecture, ETL, Enterprise data warehouse and data mart
	3.3	Data cube: a multidimensional data model
	3.4	Schemas for multidimensional data models: stars, snowflakes, and fact constellations
	3.5	Concept hierarchies
	3.6	OLAP operations
4	**Association Rule Mining**	
	4.1	Market basket analysis
	4.2	Frequent itemsets
	4.3	Apriori algorithm: finding frequent itemsets
	4.4	Generating association rules from frequent itemsets
	4.5	From association analysis to correlation analysis
5	**Classification and Cluster Analysis**	
	5.1	Introduction to Classification
	5.2	Decision tree induction
	5.3	Attribute selection measures: Information gain, Gain ratio
	5.4	Naïve Bayesian classification
	5.5	Cluster Analysis
	5.6	Partitioning methods
	5.7	k-Means: a centroid-based technique

Text Books/Resources:

1. Han, J. and Kamber, M. - Data Mining: Concepts & Techniques, 3rd Edition - Morgan Kaufmann Publishers: TB#1
   Ian H. Witten, Eibe Frank, Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publications

Reference Books/Resources

1. Mohammed J. Zaki Wagner Meira Jr - Data Mining and Machine Learning: Fundamental Concepts and Algorithms
2. Pujari, A. - Data Mining techniques - Universities Press
   Pudi, V. and Radhakrishnan, P. - Data Mining - Oxford University Press

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: BCA DSC12	**Credit:02**	**Course: Communication and Computer Networking**	**L: 02 | T:01 |P:00**

No.	**Module Description**	
1	**Introduction to Computer Networks**	
	1.1	Data Communications: Components, Data Representation, Data Flow (Simplex, Half-Duplex, Full-Duplex)
	1.2	Types of Networks (LAN, MAN, WAN), Network Topologies (Bus, Star, Ring, Mesh)
	1.3	OSI Model and TCP/IP Model
	1.4	Addressing: Physical Addresses (MAC), Logical Addresses (IP), Port Addresses

	1.5	Network Devices (Hub, Switch, Router, Bridge, Gateway)
2	**Physical Layer**	
	2.1	Functions and responsibilities of the Physical Layer
	2.2	Transmission Media (Twisted Pair Cable, Coaxial Cable, Fiber Optic, Wireless)
	2.3	Data transmission: analog and digital, Digital Transmission: Line Coding, Block Coding, Scrambling
	2.4	Analog Transmission: Modulation (AM, FM, PM), Demodulation, Multiplexing: FDM, TDM, WDM
	2.5	Bandwidth, Data Rate, and Channel Capacity
3	**Data Link Layer**	
	3.1	Functions of the Data Link Layer
	3.2	Framing Techniques (Character Count, Flag Byte, Bit stuffing)
	3.3	Flow Control (Stop-and-Wait, Sliding Window)
	3.4	Error Detection and Correction: Parity Bit, Hamming Distance, Cyclic Code Redundancy and Checksum.
	3.5	Medium Access Control (MAC) Protocols (Ethernet, Token Passing, CSMA/CD, ALOHA)
4	**Network Layer**	
	4.1	Functions of the Network Layer
	4.2	Routing: Static vs. Dynamic Routing, Routing Algorithms (Distance Vector, Link State)
	4.3	Internet Protocol (IP): IPv4 and IPv6 Packet Formats, Fragmentation, IP Addressing Schemes
	4.4	Subnetting and Supernetting,
	4.5	ARP, RARP, ICMP and IGMP
5	**Transport layer and application layer**	
	5.1	Functions of the Transport Layer
	5.2	Reliable and Unreliable Transport (TCP, UDP)
	5.3	TCP Connection Establishment and Termination (3-Way Handshake), flow and error control
	5.4	Application Layer: Client-Server Model, Common Application Protocols (HTTP, FTP, SMTP, DNS, DHCP, Telnet, SSH), Network security

Text Books/Resources

1. Forouzan B., "Data Communication and Networking", 4rd Edition, McGraw-Hill : **TB#1**

Andrew S. Tanenbaum, "Computer Networks" , 5th Edition, Person Publication : **TB#2**

Reference Books/Resources

1. James Kurose, Keith Ross, "Computer Networking: A Top-Down Approach", 7th Edition, Pearson Publication.
2. Russ White, Ethan Banks, "Computer Networking Problems and Solutions ", 1st Edition, Cisco Press.
3. https://www.javatpoint.com/computer-network-tutorial
4. https://www.geeksforgeeks.org/computer-network-tutorials/

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: BCA DSE01	Credit: 04	Course: BLOCKCHAIN TECHNOLOGY	L: 03 | T: 01 | P: 00

No.	Module Description	
1	**BLOCKCHAIN TECHNOLOGY**	
	1.1	Introduction to Blockchain
	1.2	Blockchain – Architecture, Design and Protocol
	1.3	Blockchain Consensus Protocols
	1.4	Security and Privacy Aspects of Blockchain
	1.5	Various Use Cases – Finance, Supply Chain, Government
	1.6	Hyperledger Fabric – A Platform for Blockchain Development
2	**BASIC CRYPTOGRAPHIC PRIMITIVES BEHIND THE BLOCKCHAIN**	
	2.1	Hash Function – Collision Free, Hiding and Puzzle Friendly
	2.2	Hash Pointer
	2.3	Digital Signature
	2.4	Public Key Cryptography
	2.5	Public Key Encryption
	2.6	RSA Algorithm
3	**BITCOIN BASICS**	
	3.1	Introduction to Bitcoin
	3.2	Bitcoin Works
	3.3	Creation of Coins and Tokens
	3.4	Sending Payments and Criminal Activities
	3.5	Bitcoin Governance
	3.6	Key Encryption
4	**CONSENSUS**	
	4.1	Need of Consensus
	4.2	Distributed Consensus and its Properties
	4.3	Synchronous Vs Asynchronous System
	4.4	Distributed Consensus Protocol
	4.5	Consensus in an Open System
	4.6	Consensus in Bitcoin Network
5	**Software Quality and Testing**	
	5.1	Permission Blockchain Model
	5.2	Use Cases
	5.3	Smart Contracts
	5.4	Design Limitations
	5.5	State Machine Replication
	5.6	Distributed State Machine Replication

1. **Text Books/Resources:** Blockchain: Blueprint for a New Economy by Melanie Swan
2. Introduction to Blockchain – I (Basics) (youtube.com)

Reference Books/Resources

Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks by Imran Bashier https://www.youtube.com/playlist?list=PLEAYkSg4uSQ2x4I7ASRHlraNxSwf8xOAB 3. Blockchain Tutorial - Javatpoint https://www.geeksforgeeks.org/blockchain/

No.	Module Description	
1	**Introduction to Software Testing**	
	1.1	Definition of Software Testing: Importance and objectives.
	1.2	Software Development Life Cycle (SDLC)**:** Role of testing in different SDLC models (Waterfall, Agile, V-Model, Spiral).
	1.3	Levels of Testing**:** Unit testing, Integration testing, System testing, and Acceptance testing.
	1.4	Types of Testing**:** Manual vs Automated Testing.
	1.5	Error, Fault, and Failure: Understanding the differences between them
2	**Testing Process and Life Cycle**	
	2.1	Testing Process: Requirement analysis, Test planning, Test design, Test execution, Defect reporting, and Closure.
	2.2	Test Levels**:** Unit testing, Integration testing, System testing, User acceptance testing (UAT).
	2.3	Test Documentation**:** Test plan, Test case design, Test scripts, Test reports.
	2.4	Defect Life Cycle: Steps from defect detection to closure.
	2.5	Test Case Design**:** Writing effective test cases and using test case design techniques.
3	**Test Design Techniques**	
	3.1	Black-box Testing**:** Equivalence partitioning, Boundary value analysis, Decision tables, and State transition testing.
	3.2	White-box Testing**:** Code-based testing techniques such as statement coverage, branch coverage, path coverage.
	3.3	Experience-based Testing**:** Exploratory testing, Error guessing, and Ad-hoc testing.
	3.4	Test Case Design Techniques: Writing test cases based on requirements and use cases.
4	**Types of Testing**	
	4.1.	**Functional Testing**: Focus on the functionality of the software, ensuring the system meets specified requirements. Smoke Testing, Sanity Testing, Regression Testing, Retesting, UAT, and Interface Testing.

	4.2.	Non-Functional Testing, Testing non-functional aspects like performance, security, usability, etc,Performance Testing, Load Testing, Stress Testing, Scalability Testing, and Security Testing.
	4.3.	Regression Testing: Ensuring that new code changes do not affect the existing system.
	4.4.	Exploratory Testing**:** Simultaneously learning about the system and testing it.
5	**Automated Testing**	
	5.1	Automation Introduction: Importance, benefits, and challenges.
	5.2	Tools for Automation: Selenium, QTP, JUnit, TestNG, Appium, etc.
	5.3	Automated Test Script Design**:** How to design maintainable and reusable test scripts.
	5.4	Continuous Integration/Continuous Testing: Integration of automated testing in CI/CD pipelines.

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: SEC004	**Credit: 02**	**Course: Prompt Engineering**	**L: | T: | P:**

No.	**Module Description**	
1	**Introduction to LLM and Prompting**	
	1.1	What are Text Generation Models, Magic of LLMs
	1.2	History and Types of Language Models
	1.3	Market Overview of LLMs
	1.4	Prompting Techniques and Principles
	1.5	Components and Types of Prompts
	1.6	Strategic Prompting: Personality and Mix-and-Match
2	**The Art of Text Data Generation with GenAI**	
	2.1	Standard Practices – Lists, Context, Simplification
	2.2	Translation, Style Transfer, and Contextual Prompts
	2.3	Feature Extraction and Role Prompting
	2.4	Prompt Analysis – Strengths and Weaknesses
	2.5	Content Generation – Copywriting, Social media, Scripts
	2.6	Personalized Messaging and Engagement
3	**Learning to Craft Image Data with GenAI**	
	3.1	Introduction to Diffusion Models
	3.2	Designing Prompts for AI Image Generation
	3.3	Exploring Image Gen Models – DALL·E, Midjourney, etc.
	3.4	Prompt Comparison and Reverse Engineering
	3.5	Negative Prompts, Prompt Rewriting, and Tuning

	3.6	AI Blog and App Content: Outline, Style, Images
	3.7	Ethical Use of GenAI in Text and Image Applications

1. **Text Books/Resources:** "The Art of Prompt Engineering with ChatGPT" – Nathan Hunter
2. "You Look Like a Thing and I Love You" – Janelle Shane
3. OpenAI Documentation – https://platform.openai.com/docs
4. Midjourney Documentation – https://docs.midjourney.com

Stability AI (Stable Diffusion) Docs – https://stability.ai/blog

1. **Reference Books/Resources:** "Architects of Intelligence" – Martin Ford
2. DALL·E Documentation – https://openai.com/dall-e
3. Prompt Engineering Guide – https://github.com/dair-ai/Prompt-Engineering-Guide

AI Image Gen Tools – RunwayML, Leonardo.AI, Playground AI

SYLLABUS

PROGRAM: BCOM SEMESTER: IV

Course Code: AEC004	**Credit:02**	**Course: Business Communication**	**L:03|T:01|P:00**

No.	**Module Description**	
1		
	1.1	Introduction to communication: Meaning and Definitions: Need – Objective and Principles – Communication Media – Types of Communication Process and Barriers to Communication
	1.2	Meaning and Definitions
	1.3	Definitions: Need OF Communication
	1.4	Objective and Principles – Communication Media – Types of Communication Process and Barriers to Communication
2	Business Letters	
	2.1	Business Letters: Meaning, Need
	2.2	Functions and Essentials of an effective business
	2.3	types of listeners,
3		
	3.1	Interview skill and body language, Corporate Communication, Modern Tools on Communication
	3.2	Corporate Communication
	3.3	Recent Trends in Communication
	3.4	Recent Trends in Communication

1. **Text Books:** Rajendra Pal Korahill, (2009) "Essentials of Business Communication", Sultan Chand & Sons, New Delhi, 2006. Reference Books
2. Effective Business Communication – Kaul (2007) Prentice Hall, New Delhi
3. Ramesh, MS, & C. C Pattanshetti, (2007) "Business Communication", R. Chand& Co, New Delhi, 2003.
4. Rodriquez M V, "Effective Business Communication Concept" Vikas Publishing Company, (2003).
5. Munter Mary (2002), Effective Business Communication, PHI, New Delhi

Reference Books/Resources

1. Business Communication, Dr Vinod Mishra and Dr Narendra Shukla, SBPD Publishing house

SYLLABUS

PROGRAM: BCA SEMESTER: IV

Course Code: AEC004	**Credit:2**	**Course: SOCIETY, CULTURE & HUMAN BEHAVIOUR**	**L:03|T:01|P:00**

No.	**Module Description**	
1	Indian Society and culture	
	1.1	Society and its types
	1.2	Culture–Features
	1.3	Characteristics and Diversity. Differences with Western Culture.
2	Social Stratification	
	2.1	Caste System, Class System, Communities, Ethnic Groups
	2.2	Weaker Section and Minorities, Constitutional Provisions for Scheduled Castes
	2.3	Scheduled Tribes and other Backward Classes.
3	Socio-Economic Problems	
	3.1	Poverty, Illiteracy, Unemployment
	3.2	Housing, Child Labor, Migration, Terrorism, Crime, Project Affected People
	3.3	Social Destitute, Beggary, Aged Population, Juvenile Delinquency, Problems in Family Life

1. **Text Books/Resources:** Schriver, J. M. (2010). Human Behavior and the Social Environment: Shifting Paradigms in Essential Knowledge for Social Work Practice. (5th ed.). Boston: Allyn and Bacon.
2. American Psychological Association. (2009). Publication manual of the American Psychological Association (6th ed.). Washington, DC:

Reference Books/Resources: Barker, Robert (Ed.). Social Work Dictionary. Washington, D. C.: National Association of Social Workers, Current edition or edition purchased

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSC 13	Credit:03	Course: Advanced JAVA Programming	L:03|T:01|P:00

No.	Module Description	
1	**Object-Oriented Programming & Java Fundamentals**	
	1.1	OOP Concepts: Class, Object, Encapsulation, Inheritance, Polymorphism, Abstraction
	1.2	Package Concepts, Error & Exception Handling
	1.3	Multithreading, Network Programming, JDBC
2	**JAVA FX Technology**	
	2.1	Java FX Introduction, 2D/3D Shapes, Colors, Text, Effects
	2.2	Java FX Transformations, Animation, Layout, UI Controls
	2.3	Java FX Images and Event Handling
3	**Servlet Technology**	
	3.1	J2EE Architecture, Servlet Structure & Life Cycle
	3.2	Form Handling, Cookies, Session Tracking
4	**JSP Technology**	
	4.1	JSP Introduction, Life Cycle, Scripting Elements
	4.2	JSP Implicit Objects and Directive Elements
	4.3	JSP Action Elements and Use Cases
5	**Spring and Spring Boot Framework**	
	5.1	Spring Basics: IOC, Dependency Injection, Form Processing
	5.2	Spring Data Access, JDBC, Spring Boot Introduction
	5.3	Spring Boot Apps, Starters, AOP Concepts

Text Books/Resources:

1. E.Balagurusamy,"ProgrammingwithJava",TataMcGraw-Hill:**TB#1**
2. MartyHall,LarryBrown,"CoreServletandJavaServerPages",PEARSON:**TB#2**
3. Carl Dea, Mark Heckler, Gerrit Grunwald, Jose Pereda Ph.D, Sean M Philips, "Java FX 8 Introduction by Example", Apress: **TB#3**
4. Craig Walls, "Spring IN ACTION", MANNING: **TB#4**
5. Craig Walls, Andrew Glover, "Spring Boot IN ACTION", MANNING: **TB#5**

Reference Books/Resources

1. Bruce Eckel, "THINKING IN JAVA", PEARSON
2. JDK Release Notes - https://www.oracle.com/java/technologies/javase/jdk- relnotes-index.html
3. JavaFX - https://jenkov.com/tutorials/javafx/index.html

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSC 14	Credit:04	Course: Compiler Designing	L:03|T:01|P:00

No.	Module Description	
1	**Introduction & Lexical Analysis**	
	1.1	Language processors, Phases of a compiler
	1.2	Compilation vs interpretation, Overview of the translation process
	1.3	Role of lexical analyzer, Tokens, lexemes, and patterns
	1.4	Converting RE to NFA/DFA, Subset construction, Lexical analyzer generators (Lex/Flex)
2	**Syntax Analysis**	
	2.1	Context-Free Grammars and Parsing Concepts: Derivations, parse trees
	2.2	Ambiguity, left recursion, left factoring
	2.3	Top-Down Parsing and Predictive Parsers: Recursive descent parsing, LL (1) grammars
	2.4	Bottom-Up Parsing and LR Parsing: LR (0), SLR, and LALR parsers, Shift-reduce parsing
3	**Syntax-Directed Translation and Semantic Analysis**	
	3.1	Syntax-Directed Definitions: Inherited and synthesized attributes, Evaluation order for SDDs
	3.2	Type Checking and Symbol Tables: Type systems, type checking rules, Static and dynamic types, Symbol table implementation
	3.3	Intermediate Code Generation: Three-address code (TAC), Translation of expressions and control flow, Backpatching
4	**Code Optimization**	
	4.1	**Basic Blocks and Flow Graphs:** Identifying basic blocks, DAGs for expressions, Optimization of basic blocks
	4.2	Data Flow Analysis: Control flow analysis, Live variable analysis
	4.3	Global Code Optimization Techniques: Common subexpression elimination, Loop optimization, Code motion and strength reduction
5	**Code Generation and Runtime Environments**	
	5.1	Runtime Environment and Storage Organization: Activation records, Stack allocation, heap allocation, Parameter passing mechanisms
	5.2	Code Generation Techniques: Instruction selection and addressing, Register allocation and spilling, Target machine considerations
	5.3	**Compiler Tools and Final Project:** Using Lex and Yacc/Bison, Building a simple compiler front-end

Text Books/Resources:

1. **"Compiler Design" by Chattopadhyay**
2. **"Principles of Compiler Design" by Aho and Ullman**

Reference Books/Resources

1. **https://ggnindia.dronacharya.info/Downloads/Sub-info/RelatedBook/6thSem/Compiler-Design-TEXT-book-1.pdf**

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSC 15	Credit:03	Course: Cloud Computing Foundations	L:03|T:01|P:00

No.	Module Description	
1	**Cloud Computing Basics**	
	1.1	Cloud Computing Overview, Advantages, Disadvantages
	1.2	How it works, cloud computing architecture and its components
	1.3	Cloud deployment models, Applications
	1.4	IAAS (infrastructure as a service)
	1.5	SAAS (Software as a service)
	1.6	PAAS (Platform as a service)
2	**Virtualization and Abstraction**	
	2.1	Overview of virtualization, Type of virtualization, uses of virtualization.
	2.2	How abstraction is provided in cloud, advantages, disadvantages
	2.3	Hypervisor, Type of hypervisor
	2.4	Load balancing, cloud security tools and technologies
	2.5	Security concerns, legal issues and aspects, multitenancy issues
3	**Introduction to Simulator**	
	3.1	Overview of simulator, Understanding of Cloud sim simulator
	3.2	Cloud sim architecture (user code, Cloud Sim, Grid Sim, Sim java)
	3.3	Working Platform of Clod Sim, Introduction to Green Cloud
4	**Advanced Concepts of cloud computing**	
	4.1	On premises VS On cloud, Hypervisor security in cloud computing
	4.2	Cloud networking, Serverless computing
	4.3	Server consolidation in cloud computing
	4,4	Container as a service (CAAS)
5	**Introduction to AWS**	
	5.1	Introduction to AWS, AWS free tier account setup
	5.2	Amazon web services ecosystem
	5.3	Compute services, Storage services, networking services
	5.4	Aws glacier, Terminology, Amazon glacier vs Amazon S3

Text Books/Resources:

1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing by a Practical Approach" Tata McGraw-Hill Education Private Limited, New Delhi, 2010 Edition, Fifth Reprint 2011.
2. Link of Book: https://books.google.co.in/books?id=mf0LMXve2gEC&printsec=frontcover#v=one page&q&f=false

Reference Books/Resources

1. Sandeep Bhowmik, "Cloud Computing" CAMBRIDGE
2. https://www.javatpoint.com/cloud-computing
3. https://www.geeksforgeeks.org/what-is-cloudsim/
4. https://www.tutorialspoint.com/green-cloud-computing-and-its-strategies

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSE 03 T	Credit:03	Course: Elective V- Introduction to Artificial Intelligence	L:03|T:01|P:00

No.	Module Description	
1	**Introduction to Artificial Intelligence**	
	1.1	Introduction: What Is AI?
	1.2	The Foundations of Artificial Intelligence.
	1.3	The History of Artificial Intelligence, AI Techniques,
	1.4	advantages, and limitations of AI, Impact and Examples of AI, Application domains of AI.
	1.5	Intelligent Agents: Agents and Environments.
	1.6	Good Behavior: The Concept of Rationality
	1.7	The Nature of Environments.
	1.8	The Structure of Agents.
2	**Introduction to Algorithms in Artificial Intelligence.**	
	2.1	Introduction to Algorithms in Artificial Intelligence: Definition
	2.2	Significance of algorithms in artificial intelligence.
	2.3	Basic components of an algorithm: input, output
	2.4	Control structures.
	2.5	Introduction to problem-solving techniques in Artificial Intelligence
	2.6	Knowledge representation.
	2.7	Reasoning.
3	**Search Algorithms**	
	3.1	Introduction to search algorithms
	3.2	Depth-first search.
	3.3	Breadth-first search
	3.4	Heuristic search techniques
	3.5	A* search, Hill climbing, Min-Max Search, Alpha-Beta.
4	**Introduction to neural networks and Expert System**	
	4.1	Models of neuron McCulloch – Pitts model.
	4.2	Perceptron, Adaline model, Basic learning laws.
	4.3	Topology of neural network architecture, Multilayer Neural Networks, Learning Methods.
	4.4	The human element in expert systems.
5	**Introduction of Fuzzy logic**	
	5.1	Fuzzy sets
	5.2	Fuzzy model
	5.3	Fuzzy rule generation
	5.4	Fuzzy inference system, case study

Text Books/Resources:

Artificial Intelligence" by Stuart Russell and Peter Norvig, Third Edition 2010, Pearson Education, Inc.
2. "Artificial Intelligence: Foundations of Computational Agents" by David L. Poole and Alan K.

Mackworth.
3. "Introduction to Artificial Intelligence and Expert Systems" by Dan W. Patterson, Publisher. Pearson Education India, 2015, Pages 464.
4. Introduction to Neural Network Using MatLab 6.0 by Dr. S N Sivanandam.
5. Neural Network Design by Martin T. Hagan.

Reference Books/Resources

1. "Artificial Intelligence" by Rich, E., Knight, K., & Nair, S. (2009), Tata McGraw Hill.
2. " AI Algorithms Lab: Hands-On Exercises in Artificial Intelligence" by John Smith (Year: 2023).
3. "Personalized Yoga Pose Recommendation System Using Machine Learning Techniques" by Rujuta Joshi, Nikhil Raj, and Pooja Baraskar. (International Research Journal of Engineering and Technology, 2021).

SWAYAM NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc22_cs56/preview
2. https://onlinecourses.nptel.ac.in/noc23_cs18/preview

GitHub Links:

1. https://github.com/topics/artificial-intelligence.

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSE 04 T	Credit:03	Course: Elective V- ASP.Net Programming Concepts	L:03|T:01|P:00

No.	Module Description	
1	**Introduction to C# Language**	
	1.1	An Introduction to C#: Primitive Types, Namespaces, Statements, Expressions and Operators in C#.
	1.2	Common Language Runtime (CLR), An Introduction to .NET
	1.3	Object-Oriented Programming Paradigm: Classes and Objects, Constructors, Reference Types
	1.4	Inheritance, Access Modifiers, abstract Classes, Static Classes, Sealed Classes
2	**Introduction to ASP.NET**	
	2.1	Introduction to ASP.NET, ASP.NET Architecture
	2.2	Control-based Programming, User Interface Elements
	2.3	Web Application using ASP.NET, Virtual Directories in IIS
	2.4	Deploying Websites and Web Application, ASP.NET Diagnostics and Health Monitoring
3	**State and Transaction Management**	
	3.1	State Management, ASP.NET Working with Data, Data Binding, Validation and Caching, ASP.NET 3.5 Security

	3.2	IIS 6 & IIS7 URL Authorization, Form's authentication, Role-based authorization, Trimming site maps with roles, ASP.NET Membership, Resources, and Internationalization
	3.3	Introduction to ADO.NET, Connected and Disconnected Architecture, Working with Transaction
4	**ASP.NET 3.5: Advanced Concepts and Practices**	
	4.1	Understanding HTTP Pipelining and Its Implementation in ASP.NET Web Applications
	4.2	AJAX: Asynchronous JavaScript and XML, ASP.NET Ajax Server Data, ASP.NET Ajax Client-side Library, ASP.NET Ajax Control Toolkit, ASP.NET Ajax Server Controls
	4.3	Web Services and Custom Controls
5	**MVC Model View Controller**	
	5.1	ASP.NET MVC, Web Application using MVC Pattern Razor View Controller, Model
	5.2	Introducing the Entity Framework, Code First Approach and Data First Approach
	5.3	Windows Communication Foundation (WCF), Hosting WCF Services in Windows Services, Hosting WCF Services in IIS, Building RESTful services with WCF

Text Books/Resources:

1. ASP.NET: THE COMPLETE REFERENCE Paperback – Picture Book, 1 July 2017 by Matthew Macdonald (Author)

Reference Books/Resources

1. **Programming ASP .NET by Jesse Liberty, Dan Hurwitz**

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSE 05	**Credit:03**	**Course: Elective VI-Advanced Operating System**	**L:03|T:01|P:00**

No.	**Module Description**	
1	**Advanced Process and Thread Management**	
	1.1	Process Synchronization: Critical Section, Race Condition, Mutex, Semaphores, Monitors, Inter-process Communication (IPC): Shared Memory, Message Passing
	1.2	Deadlocks: Characterization, Prevention, Avoidance, Detection and Recovery
	1.3	Multithreading Models: One-to-One, Many-to-One, Many-to-Many, Thread Scheduling and Real-Time Scheduling Policies
2	**Advanced Memory Management**	
	2.1	Paging, Segmentation and Demand Paging
	2.2	Page Replacement Algorithms: FIFO, LRU, Optimal, Clock, Thrashing and Working Set Model
	2.3	NUMA and Memory Management in Multiprocessor Systems, Memory Allocation Techniques: Buddy System, Slab Allocation
3	**Distributed Operating Systems**	
	3.1	Introduction to Distributed Systems and OS
	3.2	Distributed File Systems, Clock Synchronization and Election Algorithms

	3.3	Remote Procedure Calls (RPC), Remote Method Invocation (RMI)
	3.4	Distributed Mutual Exclusion and Deadlock Handling
4	**File Systems and Storage Management**	
	4.1	File System Architecture and Implementation
	4.2	Virtual File Systems, Journaling File Systems (e.g., ext3, ext4, NTFS)
	4.3	RAID Levels and Disk Scheduling Algorithms, File System in Distributed Environments
5	**Security, Protection, and Virtualization**	
	5.1	Authentication, Authorization, and Access Control Models
	5.2	Virtual Machines and Hypervisors, Encryption and Secure Communication
	5.3	OS-Level Virtualization (e.g., Docker, LXC), Sandboxing

Text Books/Resources:

1. **Operating System Concepts with Java**
   Eight Edition **Avi Silberschatz,Peter Baer Galvin, Greg Gagne**

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA DSE 06	**Credit:03**	**Course: Elective VI-Advanced Networking**	**L:03|T:01|P:00**

No.	Module Description	
1	**Introduction to networking**	
	1.1	Network Models: Network Models: OSI and TCP/IP, functionalities of layers of OSI
	1.2	Multicasting and Virtual Network: Internet Multicasting, Frame relay and ATM, NAT, VPN
	1.3	Type of networks: Different type of networks, Adhoc and WSN
2	**Adhoc Networking and Routing Mechanism**	
	2.1	Adhoc Networking: Introduction Adhoc Networking, Application and Challenges of MANET, Routing in Ad hoc networks
	2.2	Routing protocols: Routing protocols, topology based, position based, Broadcasting, Multicasting, & Geocasting (AODV, DSDV, BGP, RIP)
3	**Network Management and Security**	
	3.1	Network management system • Network management system • SNMP
	3.2	Network Security • Network Security – Cryptography • Symmetric and Asymmetric Cryptography • confidentiality, Integrity and authentication
4	**Security in the Internet**	
	4.1	IP Security • IP Security (IPSec) • SSL/TLS
	4.2	PGP and Firewalls • PGP • Firewalls etc.

Text Books/Resources:

1. Data Communications and Networking with TCPIP Protocol Suite| 6th Edition BY Behrouz A. Forouzan
2. Networking The Complete Reference, Third Edition, 3rd Edition by Bobbi Sandberg

SYLLABUS

PROGRAM: BCA SEMESTER: V

Course Code: BCA SEC 005	Credit:02	Course: Internet of Things	L:03|T:01|P:00

No.	Module Description	
1	**Fundamentals of IoT**	
	1.1	Introduction, Definitions & Characteristics, Challenges of IoT, IoT Architectures, Physical &Logical Design of IoT, Enabling Technologies in IoT.
	1.2	History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.
2	**Sensors Networks**	
	2.1	Definition, Types of Sensors, Types of Actuators, Examples and Working, History and Context.
	2.2	IoT Development Boards: Arduino IDE and Board Types, Raspberri Pi Development Kit, RFID Principles and components.
	2.3	The node, Connecting nodes, Networking Nodes, WSN and IoT.
3	**Applications of IoT**	
	3.1	Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT.
	3.2	Legal challenges, IoT design Ethics, IoT in Environmental Protection.

Text Books/Resources:

1. "The Internet of Things" by Samuel Greengard

Reference Books/Resources

1. . "Learning Internet of Things" by Peter Waher

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: BCA DSC 16 T	Credit:03	Course: Advanced Machine Learning	L:03|T:01|P:00

No.	Module Description	
1	**Machine Learning Concepts**	
	1.1	Applications and Future Scope of Machine Learning
	1.2	Types of Learning – Supervised and Unsupervised
	1.3	Training versus Testing
	1.4	Data Processing – Missing Data, Categorical Data, Feature Scalling
2	**Regression Techniques**	
	2.1	Simple Linear Regression
	2.2	Multiple Linear Regression
	2.3	Decision Tree Regression
	2.4	Random Forest Regression
3	**Classification Techniques**	
	3.1	Logistic Regression
	3.2	K-Nearest Neighbors (K-NN)
	3.3	Support Vector Machine (SVM)
	3.4	Naive Bayes
4	**Association and Clustering Techniques**	
	4.1	Apriori
	4.2	K-Means Clustering
	4.3	Hierarchical Clustering
5	**Reinforcement and Deep Learning Techniques**	
	5.1	Upper Confidence Bound (UCB)
	5.2	Thompson Sampling
	5.3	Artificial Neural Networks
	5.4	Convolutional Neural Networks

Text Books/Resources:

1. **ADVANCED MACHINE LEARNING Paperback – 2 June 2020 by Dr. R Kumar (Author)**

Reference Books/Resources

1. **Advanced Machine Learning Dr. Amit Kumar Tyagi, Dr. Khushboo Tripathi, Dr. Avinash Kumar Sharma**

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: BCA DSC 17 T	Credit:03	Course: User Interface and User Experience Design	L:03|T:01|P:00

No.	Module Description	
1	**Design Thinking Fundamentals**	
	1.1	Introduction to Design Thinking – Concept, Purpose, 5 Stages: Empathize, Define, Ideate, Prototype, Test
	1.2	Introduction to UI/UX – Definition with respect to digital media, User Interface, User Experience, Difference between UI and UX, History of UX, Need for UI and UX
2	**User Requirements and its Analysis**	
	2.1	Introduction to research and analysis tool (freeware) such as FigJam
	2.2	User Requirements – Definition, Types of User Research: Qualitative and Quantitative, Tools for Collection – Observation, Interviews, Questionnaires, User/Expert Reviews
	2.3	User Requirement Analysis – Target Audience and Client Needs, Competitive Analysis, Affinity Mapping, Defining User Persona
3	**User Interface Design**	
	3.1	Storyboarding, User Journey Mapping
	3.2	Gestalt Principles of Design – Aesthetics in UI, Use of Light, Color, and Contrast
	3.3	Introduction to any freeware design tool such as Figma
	3.4	Visual Communication Design – Effective Visuals for Graphical User Interfaces
4	**User Experience Design Tool**	
	4.1	Introduction to User Experience Design
	4.2	UX Design Tools – Figma Features: Navigation, Interaction, Buttons, Library Creation
	4.3	Gamification, Micro-animation
	4.4	Creating Visual Identity – Design System, Design Theme
5	**Prototyping and Testing**	
	5.1	Introduction to Wireframing – Purpose and Types (Low, Medium, High Fidelity)
	5.2	Sketching Basics – Creating Various Fidelity Wireframes in Figma
	5.3	Considerations in Wireframing – Device, Size, Behavior, Interaction
	5.4	Elements in Wireframing – Visual Design, High Fidelity Components
	5.5	Prototyping and Testing

Text Books/Resources:

1. Alan Cooper, Robert Reimann, David Cronin, “About Face: The Essentials of Interaction Design”, Wiley: TB#1
2. Don Norman, “The Design of Everyday Things”, Basic Books: TB#2
3. Jesse James Garrett, “The Elements of User Experience”, New Riders: TB#3
4. Figma Documentation – https://help.figma.com: TB#4
5. UX Planet Blog – https://uxplanet.org: TB#5

Reference Books/Resources

1. Susan Weinschenk, “100 Things Every Designer Needs to Know About People”
2. Nielsen Norman Group – https://www.nngroup.com
3. Adobe XD Tutorials – https://helpx.adobe.com/xd

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: BCA DSC 18	Credit:02	Course: Green Computing	L:03|T:01|P:00

No.	Module Description	
1	**FUNDAMENTALS OF GREEN COMPUTING**	
	1.1	Green It Fundamentals, Carbon Footprint
	1.2	Green IT - Four Dimensions, Green IT Goals
	1.3	Sustainable Business Practices, Scoop on Power
2	**GREEN ASSETS AND MODELING**	
	2.1	Green Assets, Green Building, Green Data Centre
	2.2	Green Business Process Management
	2.3	Green Enterprise Architecture
	2.4	Green Supply Chain Management
	2.5	Green Information Systems
3	**GRID FRAMEWORK**	
	3.1	Green Grid Framework
	3.2	Best Ways for Green PC
	3.3	Influencing factors of green data centres
4	**GREEN COMPLIANCE**	
	4.1	Overview of Green Compliance
	4.2	Green Transformation Process
	4.3	Green Compliance: Protocols, Standards and Audits
	4.4	Emergent Carbon Issues: Technologies and Future
	4.5	Green Enterprise Transformation Road Map

Text Books/Resources:

Reference Books/Resources

1. Alin Gales, Michael Schaefer, Mike Ebbers, ―Green Data Centre: steps for the Journey, Shroff/IBM rebook, 2011.
2. John Lamb, ―The Greening of IT, Pearson Education, 2009.
3. Jason Harris, ―Green Computing and Green IT- Best Practices on regulations & industry, Lulu.com, 2008

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: BCA DSE 07 T	Credit:02	Course: Elective VII- Data Analytics and Visualization	L:03|T:01|P:00

No.	Module Description	
1	**Introduction to Data Analytics**	
	1.1	Overview of Data Analytics: Definition, Importance & Applications
	1.2	Types of Data: Structured, Semi-structured, Unstructured
	1.3	Types of Analytics: Descriptive, Diagnostic, Predictive, Prescriptive
	1.4	Popular Tools Used: • Excel, Power BI, Tableau, Python, R
2	**Data Collection and Preprocessing**	
	2.1	Sources of Data: Databases, APIs, Files, Web Scraping
	2.2	Importing Data into Power BI / Python / Tableau
	2.3	Data Cleaning Techniques: Handling missing values, Removing duplicates, Outlier detection
	2.4	Data Transformation: Normalization & Standardization, Encoding Categorical Variables, Feature Engineering, Data Transformation Tools: Power Query (Power BI), Pandas (Python)
3	**Exploratory Data Analysis (EDA)**	
	3.1	Statistical Summary: Mean, Median, Mode, Variance, Standard Deviation, Correlation & Covariance Analysis, Grouping, Aggregating, Sorting.
	3.2	Visual EDA using:Matplotlib, Seaborn (Python), Power BI Visualizations, Tableau Chart
4	**Data Visualization Techniques**	
	4.1	Principles of Good Data Visualization
	4.2	Chart Types:Bar, Line, Pie, Area, Histogram, Box Plot, Scatter Plot, Heatmaps, Tree Maps
	4.3	Interactive Dashboards using:Power BI, Tableau, Plotly (Python)
5	**Basic Data Analytics with Python & Excel**	
	5.1	Interactive Dashboards using:Power BI, Tableau, Plotly (Python)
	5.2	Excel for Analytics: Functions, Pivot Tables, Charts, Data Analysis Toolpak
	5.3	Simple statistical and regression analysis

Text Books/Resources:

Reference Books/Resources

1. Python for Data Analysis Author: Wes McKinney
https://archive.org/details/python-for-data-analysis-pdfdrive

2. Data Visualization Insights – Hands-on
Book Author: Sharath Kumar Jagannathan
https://saintpeters.pressbooks.pub/visual/

3. Hands-On Data Visualization
Authors: Jack Dougherty & Ilya Ilyankou https://handsondataviz.org

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: BCA DSE 08 T	Credit:02	Course: Elective VII- Advanced Web Technology	L:03|T:01|P:00

No.	Module Description	
1	**Python for Web Development**	
	1.1	Overview of Python and its applications in web development
	1.2	Python Basic Components: Data types, control structures, functions, and modules, Working with files and exceptions
	1.3	Object-Oriented Programming in Python
	1.4	Introduction to Python web frameworks (Flask/Django)
2	**PyCharm IDE**	
	2.1	Installing and configuring PyCharm, Setting up a Python virtual environment
	2.2	Creating and managing web projects in PyCharm, Code navigation, refactoring, and debugging tools, Managing dependencies using PyCharm
	2.3	Running and testing applications from the IDE, Integrating version control (Git) in PyCharm
3	**API Integration**	
	3.1	Understanding APIs and REST architecture, Making HTTP requests using the requests module
	3.2	Consuming third-party APIs (e.g., weather, news, currency), Handling API responses (JSON/XML parsing)
	3.3	Authentication techniques: API Keys, OAuth, Error handling and retries in API calls
	3.4	Creating and hosting your own RESTful APIs with Flask/Django REST Framework
4	**Database Connectivity**	
	4.1	Introduction to databases: SQL and NoSQL
	4.2	Database Connectivity: Connecting to SQLite/MySQL/PostgreSQL using Python (e.g., sqlite3, mysql-connector-python, psycopg2)
	4.3	Performing CRUD operations, ORM concepts with SQLAlchemy (Flask) / Django ORM, Designing models and migrations, Query optimization and transaction handling
5	**GitHub and Version Control**	
	5.1	Introduction to Git and GitHub, Setting up Git in PyCharm
	5.2	Initializing a local repository and pushing to GitHub Branching, committing, merging, and resolving conflicts
	5.3	Collaborating with team members via pull requests, Managing project versions and releases

Text Books/Resources:

Reference Books/Resources

1. **"Python Web Development with Django"**
   Authors: Jeff Forcier, Paul Bissex, Wesley Chun *Publisher:* Addison-Wesley
   https://www.oreilly.com/library/view/python-web-development/
2. **Django for Professionals: Production Websites with Python & Django**
   *Author: William S. Vincent:*https://ia800604.us.archive.org/3/items/ebooks_202307/djangoforprofessionals.pdf
3. **"REST APIs with Flask and Python"**
   Author: Jose Salvatierra:https://github.com/PacktPublishing/REST-APIs-with-Flask-and-Python-in-2023https://handsondataviz.org

SYLLABUS

PROGRAM: BCA SEMESTER: VI

Course Code: AEC 005	**Credit:02**	**Course: Corporate Communication Skills**	**L:03|T:01|P:00**

No.	**Module Description**	
1	**Introduction to Corporate Communication:**	
	1.1	Definition -importance of corporate communication
	1.2	Historical overview evolution of corporate communication
	1.3	Management Communication
	1.4	Organizational Communications
2	**Internal Communication and Employee Engagement**	
	2.1	Importance of internal communication in organizations
	2.2	Communication channels and tools for internal communication
	2.3	Effective employee communication strategies
	2.4	Key tasks of Corporate Communications
3	**External Communication and stakeholder Management**	
	3.1	Defining External Communication
	3.2	Channels of External Communication
	3.3	Stakeholder management and Engagement
	3.4	Ethics and responsibility
4	**Crisis Communication**	
	4.1	Understanding Crisis Communication
	4.2	Developing a Crisis Communication Plan
	4.3	Responding to a Crisis, Post Crisis Recovery, Case Studies and Examples
5	**Communication Skills Development**	
	5.1	Understanding Communication
	5.2	Developing effective Verbal Communication, Improving Non-Verbal Communication
	5.3	Mastering Written Communication, Strategies for improving Communication Skills

Text Books//reference/Resources:

1. Corporate Communication: A Guide to Theory and Practice by Joep Cornelissen
2. Present Day Corporate Communication by Rudolf Beger, Springer Publications
3. Business Communication for Success by Scott McLean, Flat World Knowledge Publications
4. Corporate Communications Principles and Practice, Sage Publications