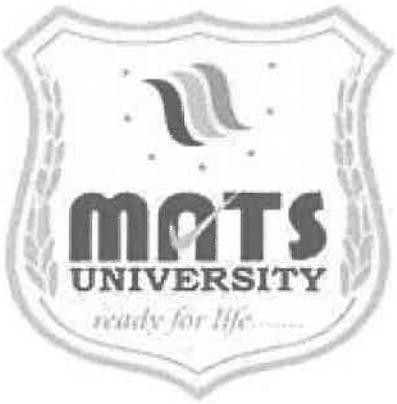
PROGRAMME PROJECT REPORT

(PPR)

Bachelor of Computer Applications

(BCA)



MATS Centre for Distance and Online Education (MCDOE)

MATS University, Raipur, Chhattisgarh

MATS UNIVERSITY: VISION

To become a world-class Centre in providing globally relevant education. MATS will be the Global University, known for the quality academic programmes and outstanding faculty, products and services to student and clients independent of place and time constraints. MATS University will be a benchmark institution for life long partnership with students, the work force and public and private enterprises. Building on its proud tradition, MATS university will extend educational opportunities to those who will make our state (Chhattisgarh), our nation and global society a better place to live and work.

MATS UNIVERSITY: MISSION

To foster an intellectual and ethical environment in which the spirit and skills within MATS will so as to impart high quality education, training, research and consultancy services with a global outlook and human values. To create and develop Technocrats, Entrepreneurs and business leaders who will strive to & improve the quality of human life. to create truly words class schools of Management Sciences, Engineering Sciences, Information Technology, Life Sciences, Basic and Applied Sciences, Humanities& Social Sciences and Life Skills.

[Dr. Sunita Kushwaha]
Asso. Professor

[Dr. Poonam Singh]
Asst. Professor

[Ms. Tanuja Sahu]
Asst. Professor

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A. Programme's Mission and Objectives:

Mission:

The mission of the programme Bachelor of Computer Applications programme in Open and Distance Learning mode is to provide high- quality education to students in the field of computer science and applications and software development, with the aim of preparing them for successful careers in the industry. The programme aims to impart knowledge and skills that enable students to develop, design, and maintain software applications effectively and efficiently.

Objectives:

The Open and Distance Learning mode Bachelor of Computer Applications programme is designed to provide students with a strong foundation in computer science, programming, and IT applicatios. The primary objective of the programme is to develop skilled professionals who can contribute effectively to the IT industry, software development, and technology-driven enterprises.

Key Objectives:

1. Fundamental Knowledge of Computer Science: Provide a comprehensive understanding of computer science concepts, including programming, data structures, algorithms, and database management.
2. Proficiency in Programming & Software Development: Train students in multiple programming languages such as C, C++, Java, Python, and web technologies to build robust software applications.
3. Applications Development & System Design: Equip students with the knowledge and skills to design, develop, and maintain software applications, websites, and enterprise solutions.
4. Understanding of Emerging Technologies: Introduce students to Artificial Intelligence, Machine Learning, Cloud Computing, Cybersecurity, and IoT to keep the updated with modern technological advancements.
5. Problem-Solving and Analytical Skills: Enhance logical thinking, problem-solving abilities, and analytical reasoning to tackle real-world IT challenges effectively.
6. Industry Readiness& Practical Exposure: Provide hands-on experience through project-based learning, internships, and industry collaborations to bridge the gap between theoretical knowledge and practical implementation.

7. Entrepreneurship & Innovation: Encourage students to explore entrepreneurial opportunities in IT startups, freelancing, and innovative software solutions.
8. Preparation for Higher Studies & Certifications: Lay a strong foundation for students who wish to pursue higher studies such as MCA, MBA, or certifications in specialized IT domains.

The Bachelor of Computer Applications programme in Open and Distance Learning mode aims to create competent IT professionals who can excel in software development, IT services, research, and entrepreneurship while adapting to the dynamic technological landscape.

B. Relevance of the Programme with University's Mission and Goals:

The Open and Distance Learning mode Bachelor of Computer Applications programme aligns with MATS University's mission to create a learning environment that fosters creativity, innovation, and critical thinking among students. The programme is designed to provide a world-class education in computer science and applications, with a focus on developing skilled professionals who can make valuable contributions to the industry and society.

The Bachelor of Computer Applications programme also aim stop inclusive and diverse learning environment, which is essential for the development of professionals who can work effectively in multicultural and global environments. The programme provides opportunities for students to engage in practical and project-based learning, which helps them develop teamwork skills, leadership skills, and communication skills. These are essential skills that prepare students to become successful professionals in the field of computer science and applications.

C. Nature of Prospective Target Group of Learners:

This Programme is specifically designed for Open and Distance Learning mode of education to meet the requirement of learners who are not able to accomplish their educational goal through the conventional mode of education.

The learners who are working professionals, housewives, reside in tribal or rural areas and not able to join the regular programme due to various reasons, are our target group of learners. Learners who want to enrolled their selves in this particular programme must have completed 10+2 or equivalent certificate.

D. Appropriateness of Programme to be Conducted in Open and Distance Learning Mode to Acquire Specific Skills and Competence:

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The Open and Distance Learning mode of MATS University system places greater emphasis on the learner, where most of the instruction is delivered through distance mode with only material They can access course materials and resources online and progress through the programme as per their convenience. It allows students to attend classes from anywhere, eliminating geographical barriers and offering more opportunities for students to learn and acquire specific skills and competencies.

The Open and Distance Learning mode will provide an opportunity to learn in a technology-driven environment for the students where they can access online resources and learning materials, attend virtual classrooms, participate in online discussions, and engage with other students and faculty through various collaborative tools. This provides a highly immersive and interactive learning experience, helping students to develop critical thinking, analytical, and problem-solving skills. The Bachelor of Computer Applications programme is highly appropriate to be conducted in Open and Distance Learning mode as it offers flexibility, self-paced learning, accessibility, technology-driven learning, and personalized learning. These all are essential for students to acquire the skills and competencies required for successful careers in the field of computer science and applications.

E. Instructional Design:

Curriculum Design, Detailed Syllabi and Duration:

The Bachelor of Computer Applications programme MATS Centre for Open and Distance Learning mode of Education, run for the period of three years which is divided in six semesters. This programme comes under the faculty of MATS School of Information Technology. Bachelor of Computer Applications is an undergraduate programme to learn the basic to advance technologies of computer applications a long with their characteristics.

Credit Points:

All courses under this programme offered by MCOE carry a certain value as credit-points. A credit point expresses the learning hours required to study a certain unit of a course. One credit point is equivalent to 30 learning hours and these learning hours includes self-learning, contact classes, assignment, project and all the activities comes under the programme to accomplish the graduation degree. Total credits of the Bachelor of Computer Applications programme are 132. The Teaching &Examination Scheme is as follows:

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Teaching and Examination Scheme

Programme: Bachelor of Computer Applications Sem: I

NHEQF Level: 4.5 | Courses					Evaluation Scheme			Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Credits	CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 01	Computer System Architecture and Digital Electronics	ODL BCA DSC 01	3	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 02	Fundamentals of Programming	ODL BCA DSC 02 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Fundamentals of Programming Lab	ODL BCA DSC 02 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 03	Database Management System	ODL BCA DSC 03 T	2	15	35	50
Discipline Specific Core Courses (DSCC)			Database Management System Lab	ODL BCA DSC 03 P	2	15	35	50
Generic Elective (GE)	Computer Applications	GE 01	Generic Elective - I		4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Applications	SEC 01	IT Skills	ODL SEC-001	2	15	35	50
Ability Enhancement Course (AEC)	Computer Applications	AEC 01	Communication Skill	ODL AEC-001	2	15	35	50
VAC/IKS (Foundation)/IKS(Core)	Computer Applications	VAC 01	Yoga and Human Conciseness	ODL VAC-001	2	15	35	50
					22	**180**	**420**	**600**

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Semester-wise distribution of Credits for Bachelor of Computer Applications:

Sr. No.	Semester	Number of Credits
1	Semester – 1	22
2	Semester – 2	22
3	Semester – 3	22
4	Semester – 4	22
5	Semester – 5	22
6	Semester – 6	22
	Total Credits	**132**

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Generic Elective Courses

Category	Name	Code
Generic Elective – I	Fundamentals of Entrepreneurship	GE004
	Business Organization	GE007

Programme: Bachelor of Computer Applications Sem: II

NHEQF Level: 4.5 | Courses					Evaluation Scheme			Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Credits	CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 04	Object Oriented Programing Concepts	ODL BCA DSC 04 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Object Oriented Programing Concepts Lab	ODL BCA DSC 04 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 05	Relational Database Management System	ODL BCA DSC 05 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Relational Database Management System Lab	ODL BCA DSC 05 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 06	Operating System Concepts	ODL BCA DSC 06	2	15	35	50
Generic Elective (GE)	Computer Application	GE 02	Generic Elective - II		4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Application	SEC 02	Web Designing	ODL SEC-002	2	15	35	50
Ability Enhancement Course (AEC)	Computer Application	AEC 02	Professional Communication Skill	ODL AEC-002	2	15	35	50
VAC/IKS (Foundation)/IKS (Core)	Computer Application	VAC 02	Environmental Studies and Disaster management	ODL VAC-002	2	15	35	50
					22	**180**	**420**	**600**

Generic Elective Courses

Category	Name	Code
Generic Elective - II	Chhattisgarh ki Jan Jatiya Sanskriti	GE017
	Intellectual Property Rights	GE014

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Programme: Bachelor of Computer Applications Sem: III

NHEQF Level: 5 | Courses					Evaluation Scheme			Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Credit	CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 07	Data Structure	ODL BCA DSC 07 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Data Structure Lab	ODL BCA DSC 07 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 08	Java Programing	ODL BCA DSC 08 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Java Programing Lab	ODL BCA DSC 08 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 09	Software Engineering	ODL BCA DSC 09	2	30	70	100
Generic Elective (GE)	Computer Applications	GE 03	Generic Elective III		4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Applications	SEC 03	Python Programing	ODL SEC 003	2	15	35	50
Ability Enhancement Course (AEC)	Computer Applications	AEC 03	Presentation Skill	ODL AEC 003	2	15	35	50
VAC/IKS (Foundation)/IKS (Core)	Computer Applications	VAC 03	Vedic Mathematics	ODL VAC 003	2	15	35	50
					22	**180**	**420**	**600**

Generic Elective Courses

Category	Name	Code
Generic Elective - III	Organizational Behavior	GE021
	Managerial Economics	GE016

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Programme: Bachelor of Computer Applications Sem: IV

NHEQF Level: 5 | Courses					Evaluation Scheme			Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Credit	CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 10	Web Technology	ODL BCA DSC 10 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Web Technology Lab	ODL BCA DSC 10 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 11	Data Warehousing and Data Mining	ODL BCA DSC 11 T	3	30	70	100
Discipline Specific Core Courses (DSCC)			Data Warehousing and Data Mining Lab	ODL BCA DSC 11 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 12	Data Communication and Computer Network	ODL BCA DSC 12	2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Applications	DSE 01	Elective IV		4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Applications	SEC 04	Prompt Engineering	ODL SEC 004	2	15	35	50
Ability Enhancement Course (AEC)	Computer Applications	AEC 04	Business Communication Skill	ODL AEC 004	2	15	35	50
VAC/IKS (Core)/IKS (Foundation)	Computer Applications	VAC 04	Society, Culture and Human Behavior	ODL VAC 04	2	15	35	50
					22	**120**	**420**	**600**

Discipline Specific Elective Courses (DSEC)	Minor **Elective IV**	Blockchain Technology	BCA DSE 01
	Minor **Elective IV**	Software Testing Techniques	BCA DSE 02

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Programme: Bachelor of Computer Applications Sem: V

NHEQF Level: 5.5 | Courses					Evaluation Scheme			Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Credits	CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 13	Advanced Java Programming	ODL BCA DSC 13 T	3	30	70	100
			Advanced Java Programming Lab	ODL BCA DSC 13 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 14	Compiler Designing	ODL BCA DSC 14	4	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 15	Cloud Computing Foundations	ODL BCA DSC 15	3	30	70	100
Discipline Specific Elective Courses (DSEC)	Computer Applications	DSE 02	Elective V		3	30	70	100
			Elective V Lab		2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Applications	DSE03	Elective VI		3	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Applications	SEC 05	Internet of Things	ODL BCA SEC 005	2	15	35	50
					22	195	455	650

Discipline Specific Elective Courses (DSEC)	Minor Elective V (ML & AI Specialization)	Introduction to Artificial Intelligence	BCA DSE 03 T
		Introduction to Artificial Intelligence Lab	BCA DSE 03 P
	Minor Elective V (Web Technology Specialization)	ASP.Net Programming Concepts	BCA DSE 04 T
		ASP.Net Programming Concepts Lab	BCA DSE 04 P
	Minor Elective VI	Advanced Operating System	BCA DSE 05
		Advanced Networking	BCA DSE 06

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Programme: Bachelor of Computer Applications Sem: VI

NHEQF Level: 5.5 | Courses					Evaluation scheme			Total Marks
Course Category	**Discipline**	**Course Category Code**	**Course Name**	**Course Code**	**Credits**	**CIA**	**ESE**	
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 16	Advanced Machine Learning	ODL BCA DSC 16 T	3	30	70	100
			Advanced Machine Learning Lab	ODL BCA DSC 16 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 17	User Interface and User Experience Design	ODL BCA DSC 17 T	3	30	70	100
			User Interface and User Experience Design Lab	ODL BCA DSC 17 P	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Applications	DSC 18	Green Computing	ODL BCA DSC 18	2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Applications	DSE 06	Elective VII		2	15	35	50
			Elective VII Lab		2	15	35	50
Ability Enhancement course (AEC)	Computer Applications	AEC 05	Corporate Communication Skills	ODL AEC 005	2	15	35	50
Skill Enhancement Course (SEC)/Internship	Computer Applications	INT 01	Internship/ Project	ODL INT 01	4	50	100	150
					22	**200**	**450**	**650**

Discipline Specific Core Courses (DSCC) Major Elective VI	Major (ML & AI) **Elective VII**	Data Analytics and Visualization	BCA DSE 07 T
		Data Analytics and Visualization Lab	BCA DSE 07 P

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Discipline Specific Core Courses (DSCC) Major Elective VI	Major (ML & AI) **Elective VII**	Advanced Web Technology	BCA DSE 08 T
		Advanced Web Technology Lab	BCA DSE 08 P

Detailed Syllabus

SYLLABUS			
PROGRAM: BCA SEMESTER: I WEF:2024-25			
Course Code: ODL 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 applications, 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

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	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 WEF:2024-25

Course Code: ODL 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

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	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/

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PROGRAM: BCA SEMESTER: I WEF:2024-25

Course Code: ODL 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

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	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 WEF:2024-25			
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

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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 WEF:2024-25

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

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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 WEF:2024-25			
Course Code: ODL 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

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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 WEF:2024-25			
Course Code: ODL 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

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	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 WEF:2024-25			
Course Code: ODL 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

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	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

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SYLLABUS

PROGRAM: BCA SEMESTER: II WEF:2024-25

Course Code: ODL 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

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	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 WEF:2024-25

Course Code: ODL 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

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	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/

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PROGRAM: BCA SEMESTER: II WEF:2024-25

Course Code: ODL 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

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	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.

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PROGRAM: BCA SEMESTER: II WEF:2024-25

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

अनुक्रमणिका

	इकाई — 9 • जनजातियों में अंतर्जातीय और अंतरजातीय संबंध	56— 61
मॉड्यूल — 4	**छत्तीसगढ़ के आभूषण ,वाद्ययंत्र ,व्यंजन**	
	इकाई — 10 • आभूषण का सामान्य परिचय • प्रमुख जनजातीय आभूषण	62 — 65
	इकाई — 11 • छत्तीसगढ़ के प्रमुख जनजातीय वाद्ययंत्र	66— 72
	इकाई — 12 • छत्तीसगढ़ का पारंपरिक भोजन और व्यंजन • त्योहार से जुड़े विशेष व्यंजन	73— 79
मॉड्यूल — 5	**छत्तीसगढ़ की लोककला एवं संस्कृति**	
	इकाई — 13 • छत्तीसगढ़ का जनजातीय हस्तशिल्प एक विस्तृत परिचय • छत्तीसगढ़ की पारंपरिक वेशभूषा	80—87
	इकाई — 14 • छत्तीसगढ़ के लोकगीत ,कहानियाँ और मौखिक परंपराएँ • आधुनिक समय में जनजातीय संस्कृति पर पड़ता प्रभाव	88— 92

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF:2024-25

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

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PROGRAM: BCA SEMESTER: II WEF:2024-25

Course Code: ODL 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)

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	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. IvanByross."Web Enabled Commercial Applications 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. DTEditorial,"WebTechnology:BlackBook",dreamteach
2. ThomasA. Powell, "TheCompleteReferenceHTML&CSS",McGrawHill

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF:2024-25

Course Code: ODL 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**	

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	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, NewDelhi.
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 WEF:2024-25

Course Code: ODL 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

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PROGRAM: BCA SEMESTER: III WEF:2024-25

Course Code: ODL 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	Applications 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/

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PROGRAM: BCA SEMESTER: III WEF:2024-25

Course Code: ODL 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.

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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 WEF:2024-25

Course Code: ODL 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/

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PROGRAM: BCA SEMESTER: III WEF:2024-25

Course Code: ODL 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.

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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.

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PROGRAM: BCA SEMESTER: III WEF:2024-25

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

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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 WEF:2024-25

Course Code: ODL 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.

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

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PROGRAM: BCA SEMESTER: III WEF:2024-25

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

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PROGRAM: BCA SEMESTER: III WEF:2024-25

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.

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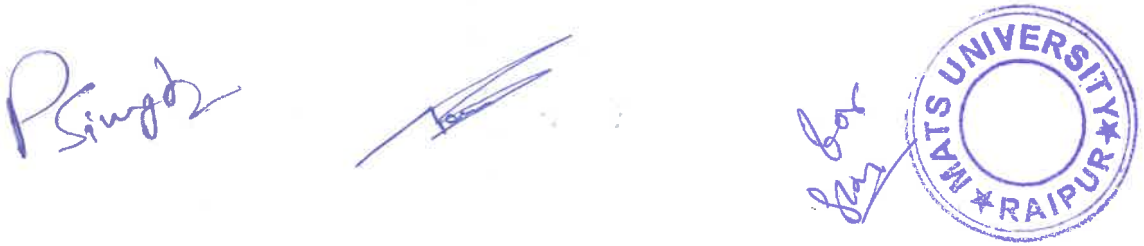
PROGRAM: BCA SEMESTER: IV WEF:2024-25

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 Applications
	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**

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PROGRAM: BCA SEMESTER: IV WEF:2024-25

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

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	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

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PROGRAM: BCA SEMESTER: IV WEF:2024-25

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

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	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	Applications Layer: Client-Server Model, Common Applications 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 WEF:2024-25

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.

	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: BCA SEMESTER: IV WEF:2024-25

Course Code: ODL 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 WEF:2024-25

Course Code: ODLAEC004	**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

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 WEF:2024-25

Course Code: ODLAEC004	**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

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SYLLABUS

PROGRAM: BCA SEMESTER: V WEF:2024-25

Course Code: ODL 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

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PROGRAM: BCA SEMESTER: V WEF:2024-25

Course Code: ODL 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**

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SYLLABUS

PROGRAM: BCA SEMESTER: V WEF:2024-25

Course Code: ODL 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

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SYLLABUS

PROGRAM: BCA SEMESTER: V WEF:2024-25

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, Applications 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.

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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 WEF:2024-25

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 Applications using ASP.NET, Virtual Directories in IIS
	2.4	Deploying Websites and Web Applications, 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

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	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 Applications 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 WEF:2024-25

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

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	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
	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**

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PROGRAM: BCA SEMESTER: V WEF:2024-25

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, Applications 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.

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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 WEF:2024-25

Course Code: ODL 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

for Registrar

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SYLLABUS

PROGRAM: BCA SEMESTER: VI WEF:2024-25

Course Code: ODL 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**

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SYLLABUS

PROGRAM: BCA SEMESTER: VI WEF:2024-25

Course Code: ODL 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

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PROGRAM: BCA SEMESTER: VI WEF:2024-25

Course Code: ODL 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

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PROGRAM: BCA SEMESTER: VI WEF:2024-25

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

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PROGRAM: BCA SEMESTER: VI WEF:2024-25

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

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SYLLABUS PROGRAM: BCA SEMESTER: VI WEF:2024-25				
Course Code: ODL 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

Duration of the Programme:

The minimum duration of the programme is three years and maximum duration is Six years.

Medium of the Programme:

English is the medium and examination will be written in English or Hindi as per choice of learner's medium.

Requirement of Faculty and Supporting Staff:

Supporting staff will be deputed at the learner supported Centre as per the need of course curriculum.

Category	Existing
Professor	02
Associate Professor	01
Assistant Professor	00

Instructional Delivery Mechanism and Usage of Media:

As the programme will offer in MATS Centre of Online Education mode (MCOE), the there are various instructional delivery mechanisms and media will be used to effectively deliver content to the learners. The programme delivery mechanism used by MCDOE follows a multimedia approach for instructions, which are as follows:

- The self-learning material (SLM) which covers all the metrics of the programme will be deliver to the learners for every course through online learning support system.
- Learning Management System (LMS) is an online platform that provides a centralized location for students to access learning content, engage in discussions, submit assignments, and take assessments. The LMS provides a user-friendly interface that is accessible on multiple devices, such as desktops, laptops, tablets, and smart phones.
- Webinars can be used for lectures, discussions, or interactive sessions with students. Pre-recorded video lectures can be used to deliver course content in a

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Concise and engaging way. Interactive multimedia includes simulations, games, and quizzes that are designed to reinforce learning.

- Discussion forums can be used to facilitate group discussions, peer-to-peer learning, and to provide feedback and support. Online and face-to-face counselling will be provided by academic counsellors appointed for the programme.
- The counseling sessions are held as per schedule drawn by the MCDOE. These counselling sessions are held in non-working hours for the learners so they can attend the counselling session properly and regularly to enhance their learning skills.
- Live session will be conducted through the use of Internet Communication Technologies (ICT) from the University's studio, the schedule of which is made available at the Leaner Support System.
- Programmes which have industrial training/practical/ project component are held at University's learners support centers and Attendance of the leaner in this part of the courses is compulsory. As per guidelines Project Work of the programme will be done by the learners and regarding this a complete guide will be deliver to the learner along with study material.
- Thee-SLMwillbedeliveredthroughOpenandDistanceLearningmodeperiodically to the enrolled learners for each course of the programme. These SLM's will be very helpful to the learners in effective learning. The assignment for internal assessment of learner's shall be deliver to the learners along with the e-SLM. Online modules are also available in the University's website for programmes offered by MCOE.
- Thecontactclassesandcounsellingschedulewillbeof30daysinayearwhichwill be divided as 15 days in each semester. The schedule of contact classes of the programme shall be communicated to the student through the various online medium.

Learner Support Services:

MATS Centre for Open and Distance Education has a fully-fledged Learner Support Services to provide guidance and help to its learners. All the necessary information has been provided to all the learner via various medium like website, helpdesk, email and by person-to-person interaction via teleconferencing and calling.

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Programme Delivery for Open and Distance Learning mode:

The curriculum is delivered through the Self Learning Materials (SLMs) in the form of Printed SLM/e-Contents/e-SLM/e-Books supported by various learning resources including audio-video aids through Learning Management System (as per four quadrant approach) along with the contact hours with discussion forums and synchronous live interactive sessions conducted through LMS as per the UGC norms for delivery of course.

Learning Management System (LMS) to Support Course Delivery for Open and Distance Learning mode:

The Learning Management System (LMS) is designed to facilitate the students to have a Global learning experience. LMS has user friendly interface approach through which the learning is made easy, interesting and meeting the global standards of learning. The audio-visual mode of teaching, the self-learning materials, discussion forums and evaluation patterns are unique and meeting the requirements of the industry and as per UGC guidelines of four quadrants approach.

The students can experience uninterrupted learning 24x7 through web and mobile at the pace chosen by them. The user interface will be simple and easy to navigate throught learning modules; the LMS will provide seamless accessibility with all the learning tools designed as per standard norms for an easy and interesting learning experience.

Nature of Contact Classes:

Based on the course material, the counsellors for Open and Distance Learning Mode of Education, are expected to guide and talk with the learners during the contact class sessions. By talking with their coworkers and the counsellor during contact sessions, the learners can work through their problems and this will help them to understand the programme objectives to learn with ease. In addition to these contact sessions, learners must participate in various training programs run by the relevant learner support system provided by the University which also including practical training approach as per Programme's structure.

Counseling Session & Structure of Study in Open and Distance Learning mode:

Following table represents the counselling session and study structure of the learners who enrolled in BCA programme.

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Counselling Sessions Study Structure in Hours

Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assign ments	Project
Semester I								
Computer System Architecture and Digital Electronics	ODL BCA DSC 01	3	90	12	48	0	30	0
Fundamentals of Programming	ODL BCA DSC 02 T	3	90	12	48	0	30	0
Fundamentals of Programming Lab	ODL BCA DSC 02 P	2	60	6	4	40	10	0
Database Management System	ODL BCA DSC 03 T	2	60	10	30	0	20	0
Database Management System Lab	ODL BCA DSC 03 P	2	60	6	4	40	10	0
Generic Elective - I		4	120	16	68	0	36	0
IT Skills	ODL BCA SEC-001	2	60	10	30	0	20	0
communication Skill	ODL BCA AEC-001	2	60	10	30	0	20	0
Yoga and Human Conciseness	ODL BCA VAC-001	2	60	6	4	40	10	0
Total		**22**	660	88	266	120	186	0

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Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assign ments	Project
Semester II								
Object Oriented Programing Concepts	ODL BCA DSC 04 T	3	90	12	48	0	30	0
Object Oriented Programing Concepts Lab	ODL BCA DSC 04 P	2	60	6	4	40	10	0
Relational Database Management System	ODL BCA DSC 05 T	3	90	12	48	0	30	0
Relational Database Management System Lab	ODL BCA DSC 05 P	2	60	6	4	40	10	0
Operating System Concepts	ODL BCA DSC 06	2	60	10	30	0	20	0
Generic Elective - II		4	120	16	68	0	36	0
Web Designing	ODL BCA SEC-002	2	60	10	30	0	20	0
Professional Communication Skill	ODL BCA AEC-002	2	60	10	30	0	20	0
Environmental Studies And Disaster management	ODL BCA VAC-002	2	60	10	30	0	20	0
Total		**22**	**660**	**92**	**292**	**80**	**196**	**0**

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Counselling Sessions Study Structure in Hours

Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assignments	Project
Semester III								
Data Structure	ODL BCA DSC 07 T	3	90	12	48	0	30	0
Data Structure Lab	ODL BCA DSC 07 P	2	60	6	4	40	10	0
Java Programing	ODL BCA DSC 08 T	3	90	12	48	0	30	0
Java Programing Lab	ODL BCA DSC 08 P	2	60	6	4	40	10	0
Software Engineering	ODL BCA DSC 09	2	60	10	30	0	20	0
Generic Elective III		4	120	16	68	0	36	0
Python Programing	ODL BCA SEC 003	2	60	10	30	0	20	0
Presentation skill	ODLAEC 003	2	60	10	30	0	20	0
Vedic Mathematics	ODL VAC 003	2	60	10	30	0	20	0
Total		**22**	**660**	**92**	**292**	**80**	**196**	**0**

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Counselling Sessions Study Structure in Hours

Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assign ments	Project
Semester IV								
Web Technology	ODL BCA DSC 10 T	3	90	12	48	0	30	0
Web Technology Lab	ODL BCA DSC 10 P	2	60					
Data ware housing and data mining	ODL BCA DSC 11 T	3	90	12	48	0	30	0
Data ware housing and data mining Lab	ODL BCA DSC 11 P	2	60	6	4	40	10	0
Data Communication and Computer Network	ODL BCA DSC 12	2	60	10	30	0	20	0
Elective IV		4	120	16	68	0	36	0
Prompt Engineering	ODL BCA SEC 004	2	60	10	30	0	20	0
Business Communication skill	ODL AEC 004	2	60	10	30	0	20	0
Society culture and human behavior	ODL VAC 04	2	60	10 10	30 30	0 0	20 20	0 0
	Total	**22**	**660**	**96**	**318**	**40**	**206**	**0**

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Counselling Sessions Study Structure in Hours

Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assignments	Project
Semester V								
Advanced Java Programming	ODL BCA DSC 13 T	3	90	12	48	0	30	0
Advanced Java Programming Lab	ODL BCA DSC 13 P	2	60	6	4	40	10	0
Compiler Designing	ODL BCA DSC 14	4	120	16	68	0	36	0
Cloud Computing Foundations	ODL BCA DSC 15	3	90	12	48	0	30	0
Elective V		3	90	12	48	0	30	0
Elective V Lab		2	60	10	30	0	20	0
Elective VI		3	90	12	48	0	30	0
Internet of Things	ODL BCA SEC 005	2	60	10	30	0	20	0
	Total	**22**	**660**	**90**	**324**	**40**	**206**	**0**

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Counselling Sessions Study Structure in Hours

Course Name	Course Code	Credits	Total Study Hours	Face to Face Counselling	Self-Study	Practical Work	Assign ments	Project
Semester VI								
Advanced Machine Learning	ODL BCA DSC 16 T	3	90	12	48	0	30	0
Advanced Machine Learning Lab	ODL BCA DSC 16 P	2	60	6	4	40	10	0
User Interface and User Experience Design	ODL BCA DSC 17 T	3	90	12	48	0	30	0
User Interface and User Experience Design Lab	ODL BCA DSC 17 P	2	60	6	4	40	10	0
Green Computing	ODL BCA DSC 18	2	60	10	30	0	20	0
Elective VII		2	60	10	30	0	20	0
Elective VII Lab		2	60	6	4	40	10	0
Corporate Communication Skills	ODL AEC 005	2	60	10	30	0	20	0
Internship/Project	ODL BCA INT 01	4	120	20	100	0	0	0
	Total	**22**	**660**	**92**	**298**	**120**	**150**	**0**

F.Procedure for Admission, Curriculum Transaction and Evaluation:

The eligibility for the admission is passed in 10+2 examination or equivalent. Learners have the convenience of accessing all the information related to admission procedure and other information through the University's website or by contacting the helpdesk number. They can download the admission form from the university website and send it through either online or offline mode. Upon receipt, the University will scrutinize the documents and process the payment of fees. Once the fees are cleared, the admission will be

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confirmed, and an enrollment number will be issued to the learner.

- **Fee Structure:**

  The fee structure of the Bachelor of Computer Applications programme in Open and Distance Learning mode of education is as follows:

Programme	Semester Tuition Fees	Semester Examination Fees	Registration Fees (One Time)
BCA	9000	1500	1500

- **Examination and Evaluation System:**

  Evaluation shall be based on continuous assessment, in which sessional work and the terminal examination shall contribute to the final grade. Sessional work shall consist of class tests, mid-semester examination(s), homework assignments,etc.,as determined by the faculty in charge of the courses of study. Progress towards achievement of learning outcomes shall be assessed using the following: time-constrained examinations; closed-book and open-book tests; problem-based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports (case-study reports); team project reports; oral presentations, including seminar presentation; viva voce interviews; computerized adaptive assessment, examination on demand, modular certifications,etc.

  Each course shall correspond to an examination paper comprising of external and internal evaluations. The semester end theory examinations for Major, Minor, Open/Generic and DSC (Discipline specific Course) vocational, value added,SEC (Skill Enhancement Course) and AEC (Ability Enhancement Course) shall be of a duration as promulgated through the examination's regulations approved by the Academic Council of the University. The credit structure for theory/Practical/tutorial, internal, external examinations and total marks for an examination shall be as per the programme structure approved by the Academic

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Council of the University as per UGC norms. Students shall acquire a minimum passingmarkininternalandexternalexaminationsseparatelytobedeclaredaspass in the respective courses, as prescribed by the Academic Council.

1. The academic performance of a candidate shall be evaluated in respect of the courses of study prescribed for each semester through the evaluation. The evaluation of students admitted in the programme shall be basedon:
   1.1. End Semester Examinations - 70% marks of total marksand
   1.2. Continuous Internal Assessment - 30% of totalmarks
2. The End Semester examinations shall be held as per the academic calendar notified by the University and the duration of end semester examination shall be of three or two hours.
3. The minimum percentage of marks to pass the programme in each semester shall be 40% in each course comprising of end semester examinations and continuous evaluation.
4. A programme shall have a specified number of credits in each semester. The number of credits along with grade points that the student has satisfactorily cleared shall measure the performance of the student.
5. Semester examination results shall have following categories:
   5.1. Passed, i.e., those who have passed in all courses of the semester examination in internal and external examination separately.
   5.2. Promoted (ATKT), i.e., those who have earned minimum 50% of credits in a particular year including both the semesters (even and odd) or those who have earned any number of credits in odd semester.
   5.3. Detained, i.e., those who are not promoted as per the above provisions shall be detained. Such students have to appear in the examination of next academic session to earn required credits (excluding the credits already earned) as per the provisions of this ordinance and only then he/she may continue the programme within stipulated period as per the provisions of this ordinance.

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Grading System

Letter Grade	Grade Points	Description	Range of Marks (%)
O	10	Outstanding	>90 to <=100
A+	9	Excellent	>80 to <=90
A	8	Very Good	>70 to <=80
B+	7	Good	>60 to <=70
B	6	Above Average	>50 to <=60
C	5	Average	>40 to <=50
P	4	Pass	=40
F	0	Fail	<40
Ab	0	Absent	Absent

- **Computation of SGPA and CGPA:**

UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

I The SGPA is the ratio of the sum of the product of the number of credits withthegradepointsscoredbyastudentinallthecoursestakenbyastudent and the sum of the number of credits of all the courses undergone by a student, i.e.

SGPA (Si) = $\sum$ (Ci x Gi) / $\sum$Ci

Where Ciis the number of credits of the ith course and Giis the grade point scored by the learner in the ith course.

Example of Computation of SGPA

Semester	Course	Credit	Letter Grade	Grade point	(Credit x Grade)
1	Course 1	3	A	8	3 x 8 = 24
1	Course 1	4	B +	7	4 x 7 = 28
1	Course 1	3	B	6	3 x 6 = 18
1	Course 1	3	O	10	3 x 10 = 30
1	Course 1	3	C	5	3 x 5 = 15
1	Course 1	4	B	6	4 x 6 = 24
		20			139
SGPA					139/20=6.95

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6. However, a student of any semester who has been detained/not appeared in examination due to less attendance/ not applied for examination/ applied but not appeared shall be out from the programme. Such a student has to take admission in the next session as an ex-student through the procedure adopted/notified by the University.

- **Continuous Internal Assessment:**

1. Continuous Internal Assessment shall be of 30% marks of total marks allotted for the course.
2. The components for continuous internal assessment for each course shall be decided by the Board of Studies of concerned subject.
3. Continuous Internal assessment shall be carried forward in case of ATKT students, there shall not be any provision of conducting internal assessment tests for ATKT students at any circumstances.

- **Evaluation and Certification of MOOCS and Vocational Courses:**

The guidelines of the University/SWAYAM portal/UGC shall be followed for evaluation and certification of MOOCs, Vocational Courses, Field Projects/ Internship/ Apprenticeship/ Community engagement and service/Honours with Research Project.

- **Letter Grades and Grades Point:**

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study.

The University may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

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II. The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme,i.e.

$CGPA = \sum (Ci \times Si) / \sum Ci$

Where Siis the SGPA of the ith semester and Ciis the total number of credits in that semester.

Example of Computation of CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit20 SGPA6.9	Credit20 SGPA7.8	Credit20 SGPA5.6	Credit20 SGPA6.0
CGPA= (20 x 6.9 + 20 x 7.8 + 20 x 5.6 + 20 x 6.0)/80 = 6.6			

TheSGPAandCGPAshallberoundedoffto2decimalpointsandreported in the transcripts. On completing all requirements for the award of the undergraduate certificate/ diploma/ degree, the CGPA shall be calculated, and this value shall be indicated on the certificate /diploma/degree. The 3-years (6 semester) and 4-years (8 semester) undergraduate degrees should also indicate the Division obtained as per following Table:

Distribution of Divisions

Division	Criterion
First division with distinction	The candidate has earned minimum number of credits for the award of the degree with CGPA of 7.5 or above
First division	The candidate has earned minimum number of credits required for the award of the degree with CGPA of 6.0 above but lesst han 7.5
Second division	The candidate has earned minimum number of credits required for the award of the degree with CGPA of 4.5 or above but less than 6.0
Third Division	The candidate has earned minimum number of credits required for the award of the degree with CGPA of 4.00 or above but lesst han 4.5

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Note: The conversion of CGPA into percentage shall be as followed to facilitate its applications in other academic matters.

Equivalent Percentage=CGPA×10.The percentage shall be rounded off up to the second decimal point.

The candidate shall be awarded a certificate/diploma/degree when he/she successfully earns the minimum required credits for the certificate/diploma/degree.

- **Issue of Transcript:**

Based on the recommendations on Letter grades, grade points and SGPA and CGPA, the university shall issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

- **Credit Transfer:**

1. The credit transfer shall be implemented as per the policy of the University framed in accordance with the guidelines issued by the UGC from time to time.
2. The member institutions of the Academic Bank of Credit established vide University Grants Commission (Establishment and Operation of Academic Bank of Credits in Higher Education) Regulations 2021 shall accept and transferthecreditsaspertheprovisionsofthisregulationasamendedfrom time to time.
3. Except for the cases of provisional promotions, the university shall facilitate credit transfer of students between them however, the student may be required to fulfil some eligibility criteria, drawing parity for a course, framed by the University in which the student seeks admission.

G. Requirement of the Laboratory Support and Library Resource:

In an open and distance learning Bachelor of Computer Applications programme, laboratory support will be provided through various means such as virtual labs, cloud-based labs, or remote access to physical labs. Simulations and virtual labs will be used to provide students with a virtual environment in which they can perform practical tasks. In some cases, it may be possible to provide students with remote access to physical labs. Moreover, Instructors will record

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practical demonstrations and provide students with access to these videos. Students can watch these videos and practice the tasks on their own computers. Instructors will use video conferencing tools to demonstrate practical tasks and answer students' questions.

H. Cost Estimates of the Programme and the Provision:

This programme was already designed and developed in the conventional mode. In this process of overall development according to the current scenario, the cost estimate of all themetrics, components, equipment, advanced lab& maintenance cost for this programme comes to amount of Rs. 2538900 and provision is made ofRs.2550000.

I. Quality Assurance Mechanism and Expected Programme Outcomes:

The programme structure of online and open and distance learning Bachelor of Computer Applications programme is developed under the guidance of the expert committee and Board of Studies and Faculty Board. It is developed as per the guideline of statutory bodies. It is approved by Board of Studies, Faculty Board and Academic Council of the University. Every year the curriculum of the course will be reviewed as per the need of IT Industry and forwarded to the Board of Studies, Faculty Board and Academic Council with suggestions. The changes in the course curriculum as per the needs and requirements from time to time. The University will help the passed-out students in their placement in different industries through the training and placement cell.

Expected Outcomes of the Programme:

- Apply computing fundamentals, specialized knowledge, math, and domain expertise to provide effective computing solutions.
- Identify, formulate, and solve complex computing problems using computing principles, drawing substantiated conclusions.
- Design and assess computing solutions and systems, considering societal aspects and specified needs.
- Utilize modern computing tools, techniques, and resources, understanding their limitations.
- Commit to professional ethics, responsibilities, and norms in computing practice.

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- Recognize the need for and engage in lifelong learning for continual development as a computing professional.
- Communicate effectively within the computing community and society, producing clear reports, documentation, presentations, personality development, health and wellbeing.