NAME OF COURSE	DURATION	BATCH	BOS DATED	STATUS
BCA (Hons.)	4 YEARS	WEF 2023		ORIGINAL

Bachelor of Computer Application (BCA)

MATS University, Raipur Chhattisgarh

Introduction

The main objective of this program is to inculcate among the students, the technical as well as the theoretical knowledge about the computers and its various applications in the different fields. This program is designed in such a way that the students can have a detailed knowledge of the subjects as well as the knowledge of the IT related applications. Throughout this program the students will go through the IT scenario, its scope, career and the essentials of the IT world. The students will be given chance to interact with the Corporate and other intellectuals in the field so as to enable them to grasp theoretical as well as technical knowledge from them and enhance their personality, skill and knowledge. The students will make use of the 24 hours internet facility and video conferencing to interact with the people in the IT field and share their knowledge and experience.

Program Objectives:

- To equip the students to meet the requirement of corporate world and Industry standard.
- To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications
- To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors

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

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1. Scope and Content

1.1. The regulations documented here are applicable to the B.C.A. programme offered by the university.
1.2. The applicability of the Regulations must be understood in the context of the given Scheme of study and the Syllabus of the programme.
1.3. The Regulations given here are in addition to the rules and regulations notified at the time of the admission.
1.4. The authorities of University may modify, add, delete, expand or substantiate any part of the Regulations and syllabi, at any time.

2. Course Content

The programme shall be for duration of six semesters, spread out in three years. Each semester of the programme shall consist of either all or some of the following components:

- Core Subjects
- AECC (Ability Enhancement Compulsory Course)
- SEC (Skill Enhancement Course)
- DSE (Discipline Specific Electives) /Choice Based
- GE (Generic Electives)
- Lab Course
- Project Work

2.1. Core Subjects

Core subjects comprises of subjects that form an integral part of the programme. These subjects provide a strong ground in basic disciplines of study.

2.2. AECC (Ability Enhancement Compulsory Course)

The students who have not done English up to class XII are to opt for Hindi Communication. They can opt Environment studies and other languages also.

2.3. SEC(Skill Enhancement Course)

This will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students.

2.4. DSE (Discipline Specific Electives) /Choice Based

Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study)

2.5. GE(Generic Electives)

An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

2.6. Lab Courses

These subjects are totally practical-based subjects. The learning of these subjects will be performed in laboratories/practical sites with equipment /resources. These subjects shall support the practical implementation of the core/core-bracket subjects. The processes of evaluation of their subjects will depend on the nature of that individual subject.

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2.7. Project Work

The project work shall be done for a duration as specified by the Coordinator, in the area, related to the main subject of study or the specialization. The project work shall give the student an insight to the situations existing in the field/marked/industries, etc.

3. Eligibility for Admission and Mode of Selection

3.1. The minimum qualification required to be eligible for admission is a pass in the HSC or 10+2 examination of a Board of a State Government, or a course recognized as equivalent thereto buy the University, desirably with the relevant or related subjects as one of the subjects of study.

3.2. The method of selection for the course shall normally by means of a Personal interview. However, the admission might also by means of an entrance test.

4. Attendance and Examination

A student is eligible to appear for the term-end examinations, only if he/she has put in a minimum of 75% attendance in each subject individually.

5. Assessment and Examination

5.1. Credits

- Credit Points will be awarded for all the subjects. One credit is equivalent to four classroom contact hours in a week.

5.2. Purpose of Internal Assessment

The Term-end Examination will be conducted as per the University regulations Sessional tests, assignment, mid-term examination, etc. will be conducted in each subject during the course of each semester, for the.

5.3. Assessment for Core Bracket Subjects

Depending on the participation and performance of students, the faculty of the Core Bracket subject wills grad the student in term of a right-point scale as given below:

Marks Secured	Grade Point	Letter Grade
80 and above	10	Outstanding(O)
70 and above but below 80	9	Excellent (A+)
60 and above but below 70	8	Very Good (A)
55 and above but below 60	7	Good (B+)
50 and above but below 55	6	Above Average (B)
45 and above but below 50	5	Average (C)
40 and above but below 45	4	Pass(P)
Below 40	0	Fail (F)
	0	Absent (AB)

This assessment is purely based on internal assessment of the subject faculty/coordinator.

5.4. Assessment of Project Work

The project work will carry a total of 100 marks. Of this, 70% marks are for the external examination and 30% marks will be awarded for internal evaluation.

5.5. Eligibility to Appear for the Term-End Exam

Students, who have put in a minimum of 75% attendance in each subject, shall be eligible to appear for the Term-end examination.

6. Eligibility for Pass

6.1. A student shall be declared to have passed in a subject, if he/she secures at least 40% marks in the term-end examination and an aggregate of 40% including internal assessment.

6.2. When a student reappears for the failed subject(s), the internal assessment marks originally secured by him/her in the first appearance in the subject(s), if any, will be carried forward.

6.3. A student shall be declared to have passed in Core Bracket subject, if he/she secures at least a pass grade.

6.4. Promotion of the student to the next semester, is not automatic, but is dependent on certain other conditions.

7. Classification of Successful Students

7.1. On successful completion of the programme, the students will be classified as below:

- **Distinction** Those securing an aggregate marks of 75% and above in all the subjects;
- **First Class** Those securing an aggregate mark of less than 75%, but above 60% in all the subjects;
- **Second Class** Those securing an aggregate mark of less than 60%, but above 50% in all the subjects;
- **Pass** Those securing an aggregate mark of less than 50% in all the subjects;

7.2. Ranks

Only students, who have passed each of the semester examination at the first appearance, shall be eligible for award of Ranks. The first three ranks shall be notified.

8. Award of Qualification

Students will be awarded the Bachelor Degree of B.C.A., upon fulfillment of the following criteria:

a) Must have passed all the subjects of the six semester with a minimum of 40% in each subject including Internal assessment and secured 45% in aggregate;
b) Must have secured at least a pass grade in all the Core Bracket subjects.
c) Must have secured a minimum of 45% marks in the project work (wherever applicable).
d) Must have complied with all other assessment guidelines and criteria notified during the conduct of the programme.

9. Maximum period for the complement of the Programme

The maximum period for the completion of the programme shall be five years from the date of joining the programme.

10. General Guidelines

10.1. Academic Integrity and Ethics

- A student who has committed an act of academic dishonesty will be deemed to have failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basic for disciplinary action but also is relevant to the evaluation of student's level of performance and progress.

- Where there has been violation of the basic ethos and principles of academic integrity and ethics, the Director/Board of Examiners/Course coordinator may use their discretion in terms of disciplinary action to be taken.

Academic dishonesty includes, but is not necessarily limited, to the following:

- Cheating or knowingly assisting another student in committing a act of cheating;
- Unauthorized possession of examination materials, destruction or hiding of relevant materials;
- Act of plagiarism;
- Unauthorized changing of marks or marking on examination records.

10.2. Attendance

a) Student are required to attend and participate in all scheduled class sessions, guest lecturer, workshops, outbound learning programs and club/forum activities of both academic and non-academic nature.
b) Students may be dropped from the programs due to excessive and non-intimated absences.
c) Students must notify the program coordinator in writing, the reasons for absence, if any, from class sessions, activities and assessment components.
d) On notification of absences (including anticipated absences), the Director/Programmer coordinator would determine whether the absences could be rectified or whether it is possible to satisfactorily complete the subject with the number of identified absences.

10.3. General

a) The students are expected to spend a considerable amount of time in research, reading and practice.
b) All students are expected to develop and maintain a positive profession attitude and approach throughout the Programme and in conduct of all other activities.
c) Attendance alone is not sufficient. Students are expected to participate, to help the class learn and understand the topics under consideration.
d) Food and drinks are not permitted in the classroom / conference hall.
e) All students are expected to dress as per stipulated dress code.

Programme: Bachelor of Computer Application (BCA) Sem: I											
NHEQF Level: 4.5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 01	Computer System Architecture and Digital Electronics	BCA DSC 01	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 02	Fundamentals of Programming	BCA DSC 02 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Fundamentals of Programming Lab	BCA DSC 02 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 03	Database Management System	BCA DSC 03 T	1	1	0	2	30	70	100
Discipline Specific Core Courses (DSCC)			Database Management System Lab	BCA DSC 03 P	0	0	4	2	15	35	50
Generic Elective (GE)	Computer Application	GE 01	Generic Elective - I		3	1	0	4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Application	SEC 01	IT Skills	BCA SEC 01	0	0	4	2	15	35	50
Ability Enhancement Course (AEC)	Computer Application	AEC 01	Communication Skill	BCA AEC 01	1	1	0	2	15	35	50
VAC/IKS (Foundation)/IKS (Core)	Computer Application	VAC 01	Yoga Education	BCA VAC 01	1	0	2	2	15	35	50
					10	5	14	22	195	455	650

Programme: Bachelor of Computer Application (BCA) Sem: II											
NHEQF Level: 4.5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 04	Object Oriented Programing Concepts	BCA DSC 04 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Object Oriented Programing Concepts Lab	BCA DSC 04 P	0	0	2	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 05	Relational Database Management System	BCA DSC 05 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Relational Database Management System Lab	BCA DSC 05 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 06	Operating System Concepts	BCA DSC 06	2	0	0	2	15	35	50
Generic Elective (GE)	Computer Application	GE 02	Generic Elective - II		3	1	0	4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Application	SEC 02	Web Designing	BCA SEC 02	0	0	4	2	15	35	50
Ability Enhancement Course (AEC)	Computer Application	AEC 02	Professional Communication Skill	BCA AEC 02	1	1	0	2	15	35	50
VAC/IKS (Foundation)/IKS (Core)	Computer Application	VAC 02	Environmental Studies	BCA VAC 02	1	1	0	2	15	35	50
					11	5	10	22	180	420	600

Programme: Bachelor of Computer Application (BCA) Sem: III											
NHEQF Level: 5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 07	Data Structure	BCA DSC 08 T	3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)			Data Structure Lab	BCA DSC 08 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 08	Java Programing	BCA DSC 09 T	3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)			Java Programing Lab	BCA DSC 09 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSE 01	Software Engineering	BCA DSC 07	3	1	0	4	30	70	100
Generic Elective (GE)	Computer Application	GE 03	Generic Elective III		3	1	0	4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Application	SEC 03	Python Programing	BCA SEC 03	0	0	4	2	15	35	50
					10	4	16	22	180	420	600

Programme: Bachelor of Computer Application (BCA) Sem: IV											
NHEQF Level: 5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 09	Web Technology	BCA DSC 11 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Web Technology Lab	BCA DSC 11 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 10	Machine Learning	BCA DSC 12 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Machine Learning Lab	BCA DSC 12 P	0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSE 02	Data Communication and Computer Netwok	BCA DSC 10	3	1	0	4	30	70	100
Discipline Specific Elective Courses (DSEC)	Computer Application	DSE 03	Elective IV		3	1	0	4	30	70	100
Ability Enhancement Course (AEC)	Computer Application	AEC 03	Creative Content Writing	BCA AEC 03	0	0	4	2	15	35	50
VAC/IKS (Core)/IKS (Foundation)	Computer Application	VAC 03	Health and Wellness	BCA VAC 03	1	1	0	2	15	35	50
					11	5	12	22	180	420	600

Discipline Specific Elective Courses (DSEC)		Minor **Elective IV**	Blockchain Technology	BCA DSE 01
		Minor **Elective IV**	Numerical Methods	

Programme: Bachelor of Computer Application (BCA) Sem: V											
NHEQF Level: 5.5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 11	Advanced Java Programming	BCA DSC 13 T	2	1	0	3	30	70	100
Discipline Specific Core Courses (DSCC)			Advanced Java Programming Lab	BCA DSC 13 P	0	0	4	2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Application	DSC 12	Elective V		3	1	0	4	30	70	100
			Elective V Lab		0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSE 04	Mathematical and Computer Logic for Nyaya Sastra Studies	BCA DSE 02	3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Application	DSE 05	Cloud Computing Foundations	BCA DSE 03	3	1	0	4	30	70	100
Skill Enhancement Course (SEC)/Internship	Computer Application	SEC 04	Internet of Things	BCA SEC04	0	0	6	3	15	35	50
					11	4	14	22	165	385	550

Discipline Specific Elective Courses (DSEC)		Minor **Elective V (ML & AI Specilizatio**	Introduction to Artificial Intelligence	BCA DSC 14 T
			Introduction to Artificial Intelligence Lab	BCA DSC 14 P
		Minor **Elective V (Web Technolog**	ASP.Net Programming Concepts	BCA DSC 14 T
			ASP.Net Programming Concepts Lab	BCA DSC 14 P
		Minor **Elective V (Cloud Computing Specilizatio n)**	Cloud Computing with Amazon Web Services (AWS)	BCA DSC 14 T
			Cloud Computing with Amazon Web Services (AWS) Lab	BCA DSC 14 P

Programme: Bachelor of Computer Application (BCA) Sem: VI											
NHEQF Level: 5.5 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
Course Category	Discipline	Course Category Code	Course Name	Course Code	Hours			Credits			
					Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 13	Elective VI		4	1	0	4	30	70	100
			Elective VI Lab		0	0	4	2	15	35	50
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 14	Elective VII		4	1	0	4	30	70	100
			Elective VII Lab		0	0	4	2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Application	DSE 06	Elective VIII		3	1	0	4	30	70	100
Ability Enhancement course(AEC)	Computer Application	AEC 04	Corporate Communication Skills	BCA AEC 04	1	1	0	2	15	35	50
Skill Enhancement Course (SEC)/Internship	Computer Application	INT 01	Internship	BCA INT 01	0	0	16	4	50	100	150
					12	4	24	22	185	415	600

Discipline Specific Core Courses (DSCC) Major Elective VI		Major (ML & AI) **Elective VI**	Advanced Machine Learning	BCA DSC 15 T
			Advanced Machine Learning Lab	BCA DSC 15 P
		Major (Web Technology)	User Interface and User Experience Design	BCA DSC 15 T
			User Interface and User Experience Design Lab	BCA DSC 15 P
		Major (Cloud	Big Data Analytics on the Cloud	BCA DSC 15 T

		Computing & Cyber Security)	Big Data Analytics on the Cloud Lab	BCA DSC 15 P

Discipline Specific Core Courses (DSCC) Major Elective VII		Major (Web Technology)	Data Analytics and Visiualization	BCA DSC 16 T
			Data Analytics and Visiualization Lab	BCA DSC 16 P
		Major (Web Technology	Advanced Web Technology	BCA DSC 16 T
			Advanced Web Technology lab	BCA DSC 16 P
		Major (Cloud Computing & Cyber	DevOps and Cloud Computing	BCA DSC 16 T
			DevOps and Cloud Computing Lab	BCA DSC 16 P

Discipline Specific Elective Courses (DSEC)		Minor **Elective**	Green Computing	BCA DSE 04
		Minor **Elective**	Advanced Operating System	BCA DSE 04

Programme: Bachelor of Computer Application (BCA) Sem: VII											
NHEQF Level: 6 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
					Hours			Credits			
Course Category	Discipline	Course Category Code	Course Name	Course Code	Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 15	Algorithm Analysis and Design	BCA DSC 17	3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 16	Elective IX		3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)			Elective IX Lab		0	0	4	2	15	35	50
Discipline Specific Elective Courses (DSEC)	Computer Application	DSE 07	Elective X		3	1	0	4	30	70	100
Discipline Specific Elective Courses (DSEC)			Elective X Lab		0	0	4	2	15	35	50
RM/PM/OJT	Computer	RP/DISERT/	Elective XI		0	0	12	6	30	70	100
					9	3	20	22	150	350	500

Discipline Specific Core Courses (DSCC)		Major **Elective IX**	Mobile App Development	BCA DSE 05 T
			Mobile App Development Lab	BCA DSE 05 P
		Major **Elective IX**	Decentralized App Development (Solidity)	BCA DSE 05

Discipline Specific Elective Courses (DSEC)		Minor **Elective X**	Wireless Sensor Network	BCA DSE 06 T
			Wireless Sensor Network Lab	BCA DSE 06 P
		Minor Elective X	Cryptography	BCA DSE 06 T
			Cryptography Lab	BCA DSE 06 P

RM/PM/OJT	RP 01		Research Project	BCA RP 01
	DIST 01		Dissertation	BCA DIST 01
	OJT 01		On Job Training	BCA OJT 01

Programme: Bachelor of Computer Application (BCA) Sem: VIII											
NHEQF Level: 6 | Courses					Teaching Scheme				Evaluation Scheme		Total Marks
					Hours			Credits			
Course Category	Discipline	Course Category Code	Course Name	Course Code	Theory	Tutorial	Practical		CIA	ESE	
Discipline Specific Core Courses (DSCC)	Computer Application	DSC 17	Theory of Computation	BCA DSC 18	3	1	0	4	30	70	100
Discipline Specific Elective Courses (DSEC)	Computer Application	DSC 18	Elective XII		3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)	Computer Application	DSE 08	Elective XI		3	1	0	4	30	70	100
Discipline Specific Core Courses (DSCC)			Elective XI Lab		0	0	4	2	30	70	100
RM/PM/OJT	Computer Application	RP/DISERT/ OJT 02	Elective XIII		0	0	32	8	60	140	200
					9	3	36	22	180	420	600

Discipline Specific Elective Courses (DSEC)		Major (ML & AI) **Elective XI**	Research Trends in Machine Learning and AI	BCA DSE 07 T
			Research Trends in Machine Learning and AI Lab	BCA DSE 07 P
		Major (Web Technology)	Research Trends in Web Technology	BCA DSE 07 T
			Research Trends in Web Technology Lab	BCA DSE 07 P
		Major (Cloud Computing & Cyber Security)	Research Trends in Cloud Computing	BCA DSE 07 T
			Research Trends in Cloud Computing Lab	BCA DSE 07 P

Discipline Specific Elective Courses (DSEC)		Minor **Elective XII**	Operation Research	BCA DSE 08
			Graph Theory	BCA DSE 08

RM/PM/OJT	RP 02		Research Project	BCA RP 02
	DIST 02		Dissertation	BCA DIST 02
	OJT 02		On Job Training	BCA OJT 02

SYLLABUS

PROGRAM: BCA SEMESTER: I WEF: 2024-25

Course Code: DSC001	Credit: 04	Course: CADE	L: 03 | T: 01 | P: 00

Prerequisites:	**Basic CADE Concepts**
Objectives:	The objective of *Computer Architecture and Digital Electronics* is to provide students with an understanding of the fundamental principles of computer systems, focusing on the structure, function, and design of hardware components, as well as the basics of digital logicand circuit design. This knowledge forms the foundation for analyzing and optimizing computer performance and functionality.
Course Outcome:	Upon successfully finishing the course, students will have the capability to:

No.	Course Outcome	BT Level
CO1	Students will be able to describe the basic organization of a computer, including its components like input/output devices. They will also understand the evolution and classification of computers, as well as various types of memory.	Understand
CO2	Students will be able to work with number systems, perform conversions, and apply Boolean algebra to solve logical expressions.	Analyze, Apply
CO3	Students will be capable of simplifying Boolean expressions using Karnaugh maps and other minimization techniques. Also capable to use the logic functions and gates.	Apply
CO4	Students will gain an understanding of different types of software and their relationships with hardware. They will explore software development processes and operating systems.	Apply
CO5	Students will develop an understanding of cyber security, its significance, and the challenges involved. They will be familiar with different types of cyber-attacks and emerging trends in cyber security and digital media.	Apply

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Program Outcomesand Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√	√				
CO2	√	√	√				
CO3	√	√	√				
CO4	√	√	√				
CO5	√	√	√				

No.	Module Description		BT Level	Hours
1	**Computer Organization**			**10**
	1.1	Introduction of Computers, Characteristics of computers	U, AN	1
	1.2	Evolution of computer	U, AN	1
	1.3	Input unit, Output unit and Storage unit	U, AP, AN	2
	1.4	Arithmetic Logic Unit (ALU), Control Unit (CU), Central ProcessingUnit(CPU)	U, AP, AN	3
	1.5	System concepts	U, AP, AN	1
	1.6	Classification of computers	U, AP, AN	1
	1.7	Types of Memory: RAM, ROM, PROM, EPROM, EEPROM, Cache	U, AP, AN	1
2	**Digital System and Boolean Algebra**			**12**
	2.1	Overview of digital systems and their application, number system: representation and conversion	U, A, AN	3
	2.2	Binary coded decimal (BCD)representation	U, AP, AN	2
	2.3	Boolean algebra fundamentals	U, AP, AN	1
	2.4	Basic Theorem and properties of Boolean algebra	U, AP, AN	2
	2.5	Boolean function	U, AP, AN	1
	2.6	Canonical and standard forms	U, AP, AN	3
3	**Gate-level Minimization**			**14**
	3.1	Introduction	U, AN	1

	3.2	The map method	U, AP, AN	2
	3.3	Karnough maps(K-maps) for simplifying boolean expressions.	U, AP, AN	3
	3.4	product of sums simplification	U, AP, AN	3
	3.5	Don't care condition	U, AP	2
	3.6	NAND and NOR implementation	U, AP, AN	3
4	**Computer Software**			**13**
	4.1	Introduction to Software	U, AN	1
	4.2	Relationship between Hardware and Software	U, AP	1
	4.3	Types of Software	U, AP, AN	1
	4.4	Logical System Architecture	U, AP, AN	1
	4.5	Firmware, Middleware	U, AP, AN	1
	4.6	Pre-written Software, Customized Software	U, AP, AN	1
	4.7	Developing Customized Software	U, A, AN	1
	4.8	Software development Life cycle	U, AP, AN	1
	4.9	Software Engineering	U, AP, AN	2
	4.10	Introduction to Operating System, Functions of an operating systems	U, AP, AN	3
5	**Cyber Security**			**11**
	5.1	Cyber security: Introduction, Significance, Working of Cyber Security, Challenges, Cyber Laws	U, AP, AN	3
	5.2	Types of cyber-attacks: malware, Phishing, DDoS, Password, Man in the middle, SQL Injections, Prevention from Cyber Attacks.	U, AP, AN	3
	5.3	Future Trends in Cyber security: Artificial Intelligence and Machine Learning, Cloud Security, Internet of Things (IoT) Security, QuantumSecurity, 5G Security	U, AP, AN	3
	5.4	Emerging Trends in Digital Media: Influencer Marketing, Omnichannel Marketing, Artificial Intelligence, Deep fake videos,Video Marketing, Metaverse, Chatbots	U, AP, AN	2

Course Modules and Course	#	Module	Course Outcomes				
			CO1	CO2	CO3	CO4	CO5
	1	Computer Organization	☑				
	2	Digital System and Boolean Algebra		☑			

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Outcomes Mapping:	3	Gate-level Minimization			? ?		
	4	Computer Software				?	
	5	Cyber Security					?

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/ Resource	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

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SYLLABUS

PROGRAM: BCA SEMESTER: I WEF: 2024-25

Course Code: BCA DSC-002	Credit: 04	Course: Fundamentals of Programming	L: 03 | T: 01 | P: 00

Prerequisites:	Nil
Objectives:	Familiarize students with the concepts of programming languages, logical concept of programming: algorithm, flowchart, token, function, structure, pointer, memory allocation,and file handling etc.
Course Outcome:	Upon successfully finishing the course, students will have the capability to:

No.	Course Outcome	BT Level
CO1	Student gain the understanding of concepts of Algorithm,Flowchart and basic of programming.	Understanding, Apply , Analysis
CO2	The student becomes able to understand and use the concepts of control statements, Array and String.	Understanding, Apply, Analysis
CO3	Student gain the ability to apply the concept of Function andpointer.	Understanding, Apply, Analysis
CO4	Student gain the ability to apply the concept of Structure. Also get familiar with the memory allocation scheme.	Understanding, Apply, Analysis
CO5	Student becomes proficient in utilizing the of concept of filehandling.	Understanding, Apply, Analysis

Program Outcomesand Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√	√				
CO2	√	√	√				
CO3	√	√	√				
CO4	√	√	√				
CO5	√	√	√				

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No.	Module Description		BT Level	Hours
1	**Algorithm, Flow Chart and Programming languages**			**10**
	1.1	Introduction of algorithm and flowchart	U,AP,AN	2
	1.2	Type of software and programming languages	U,AP,AN	1
	1.3	Introduction to C : Program structure, Per processor Derivatives, Header files	U,AP,AN	1
	1.4	Token, Data Type, Format Specifier, Operators	U,AP,AN	4
	1.5	Variable and Scope of the variable	U,AP,AN	2
2	**Control Statements , Array and String**			**14**
	2.1	Control Statements : Definition and types	U,AP,AN	1
	2.2	Branching, Looping , Jumping Statement and its types	U,AP,AN	4
	2.3	One dimensional, Two dimensional and Multidimensional Array	U,AP,AN	3
	2.4	Character Array: Initialization, Reading , writing	U,AP,AN	3
	2.5	String Manipulation functions	U,AP,AN	3
3	**Function and Pointer**			**13**
	3.1	Function: Introduction, types of functions	U,AP,AN	3
	3.2	Function: Nested function, Recursion	U,AP,AN	2
	3.3	Passing array as a function parameter	U,AP,AN	2
	3.4	Pointer and Array : Pointer Expression, pointer with array and string, Array of Pointer	U,AP,AN	3
	3.5	Pointer and Function: Pointer as function parameter	U,AP,AN	3
4	**Structure and Dynamic Memory Allocation**			**13**
	4.1	Array of Structure, Array Within Structure	U,AP,AN	2
	4.2	Structure within structure	U,AP,AN	2
	4.3	Structure and Function : Structure as a function parameter	U,AP,AN	3
	4.4	Memory allocation concept	U,AP	2
	4.5	Dynamic memory allocation : malloc, calloc, free and realloc	U,AP	4
5	**File Handling**			**10**

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	5.1	Introduction of file concept: Opening, closing	U,AP	2
	5.2	Input/output Operation in file	U,AP	3
	5.3	Error Handling during I/O Operation	U,AP,AN	3
	5.4	Random Access file	U,AP	2

Course Modules and Course Outcomes Mapping:

#	Module	CO1	CO2	CO3	CO4	CO5
1	Algorithm, Flow Chart and Programming languages	√				
2	Control Statements , Array and String		√			
3	Function and Pointer			√		
4	Structure and Dynamic Memory Allocation				√	
5	File Handling					√

Text Books/ Resources:

1. E Balaguru Swami, " Programming in ANSI", Tata McGraw Hills: **TB#1**
2. K R Venugopal and S R Prasad, "Mastering in C", Tata McGraw Hills: **TB#2**

Reference Books/ Resources

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

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SYLLABUS

PROGRAM: BCA SEMESTER: I WEF: 2024-25

Course Code: SEC 001	Credit: 04	Course: IT Skills	L: 03 | T: 01 | P: 00

Prerequisites:	Basic IT Skills Concepts
Objectives:	Develop skills in document creation, Create and structure web pages using HTML, including elements, forms, and responsive design, Create engaging presentations by adding text, graphics, animations, and transitions using Microsoft PowerPoint, Master data entry, organization, and analysis through formulas and formatting in Microsoft Excel.
Course Outcome:	Upon successfully finishing the course, students will have the capability to:

No.	Course Outcome	BT Level
CO1	Students will be Able to prepare documents, letters and do necessary formatting of the document.	Understand
CO2	Students will be able Worksheet creation, inserting and editing data in cells, Applying basic formulas and functions.	Analyze, Apply
CO3	Students will be capable Opening/saving a presentation and printing of slides and handouts.	Apply
CO4	Students will be able to create and structure web pages using HTML elements, tags, and attributes.	Apply
CO5	Students will gain proficiency in creating and managing websites using WordPress, including installation, site settings, publishing posts, formatting content, managing media, and creating links.	Apply

Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√		√			√
CO2	√	√		√			√
CO3	√	√					√
CO4	√					√	
CO5	√					√	

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No.	Module Description		BT Level	Hours
1	**Word Processing**			**10**
	1.1	Working With Document: Opening, Saving and Editing Files, Inserting, Deleting Files	U, AN	1
	1.2	Margins: Converting Files to Different Format Using Tools Bar	U, AN	1
	1.3	Page Style, Alignment -Indents, Line Space, Border and Shading	U, AP, AN	2
	1.4	Header and Footer Setting	U, AP, AN	3
	1.5	Drawing: Inserting Clip Arts Pictures/Files Etc.	U, AP, AN	1
	1.6	Word Completion: Spell Checks	U, AP, AN	1
	1.7	Mail Merging	U, AP, AN	1
2	**Spread Sheet**			**8**
	2.1	Spread Sheet and Its Applications	U, AP, AN	2
	2.2	Working With Spreadsheet: Opening, Saving, File Setting	U, AP, AN	2
	2.3	Spreadsheet Addressing: Rows, Columns and Cells, Referring Cells	U, AP, AN	1
	2.4	Inserting Data: Insert Cells, Columns, Rows and Sheets	U, AP, AN	1
	2.5	External Files: Frames Clipart, Pictures etc.	U, AP, AN	1
	2.6	Formula Tab	U, AP, AN	1
3	**Presentation**			**10**
	3.1	Introduction To Presentation: Opening New Presentation	U, AN	1
	3.2	Selecting Presentation Layout	U, AP, AN	2
	3.3	Adding Text To The Presentation	U, AP, AN	1
	3.4	Header And Footer	U, AP, AN	2
	3.5	Slide Layout	U, AP	2
	3.6	Adding Graphics To The Presentation, Setting Animation And Transition Effect	U, AP, AN	2
4	**HTML Basics**			**10**
	4.1	Introduction Of HTML, Elements Of HTML	U, AN	2
	4.2	Attributes, Headings, Paragraph, Styles Of HTML	U, AP	2
	4.3	CSS, Tables	U, AP, AN	2

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	4.4	HTML Class, Id	U, AP, AN	1
	4.5	HTML Responsive	U, AP, AN	2
	4.6	HTML Forms	U, AP, AN	1
5	**Web Designing**			**11**
	5.1	Introduction to Web Designing Tool	U, AP, AN	2
	5.2	Admin and General Site Settings	U, AP, AN	3
	5.3	Writing Post and Formatting Text	U, AP, AN	2
	5.4	Publishing a Post	U, AP, AN	2
	5.6	Adding Image and Managing Media Library and Creating Links	U, AP, AN	2

Course Modules and Course Outcomes Mapping:

#	Module	Course Outcomes				
		CO1	CO2	CO3	CO4	CO5
1	Word Processing	√				
2	Spread Sheet		√			
3	Presentation			√		
4	HTML Basics				√	
5	Web Designing					√

Text Books/

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

Resources:

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

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SYLLABUS

PROGRAM: BCA SEMESTER: I WEF: 2024-25

Course Code: AEC-001	Credit: 02	Course: COMMUNICATION SKILLS	L: 03 | T: 01 | P: 00

Prerequisites:	Nil
Objectives:	To enhance language proficiency by providing adequate exposure to reading and writing skills. To orient the learners towards various communication tasks. To increase the rangeof lexical resource through a variety of exercises
Program Outcome:	Upon successfully finishing the program, students shall be able to:

No.	Course Outcome
CO1	Identify key principles of effective public speaking.
CO2	Describe delivery techniques for use during a public speech.
CO3	Identify the role and importance of your audience.
CO4	Discuss tips and tricks to giving an effective speech.

Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√		√			√
CO2	√	√		√			√
CO3	√	√					√
CO4	√					√	

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Syllabus				
No.	**Module Description**		**BT Level**	**Hours**
1	**Basics of Communication**			**10**
	1.1	Communication: An Introduction	Understand	1
	1.2	Definition and Scope	Understand	1
	1.3	Process of Communication	Understand	2
	1.4	Barriers to Communication	Understand	2
	1.5	Types of Communication	Understand	2
2	**Writing Skills**			**9**
	2.1	Letter Writing- Formal and Informal	Understand	1
	2.2	CV, Email, Message	Understand	2
	2.3	Minutes, Report Writing	Understand	1
	2.4	Notice, Memoranda	Understand	1
3	**Reading Skills**			**10**
	3.1.	Types of Readings	Understand	2
4	**Listening Skills**			**10**
	4.1.	Effective listening	Understand	2
	4.2.	Barriers to listening	Understand	2
5	**Speaking Skills**			**11**
	5.1.	Introduction to Soft Skills	Understand	2
	5.2.	Personality Development	Understand	1
	5.3.	Time Management/leadership Skills	Understand	2
	5.4.	Interviews/ Group Discussion/Presentation Skills	Understand	2
	5.5.	Short Speech	Understand	2

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Course Modules andCourse Outcomes Mapping:	#	Module	Course Outcomes			
			CO1	CO2	CO3	CO4
	1	Basics of Communication	☑			
	2	Writing Skills		☑		
	3	Reading Skills	☑		☑	
	4	Listening Skills				☑
	5	Speaking Skills	☑	☑		
Text Books/ Reference book	1. Brown, Ralph: Making Business Writing Happen: A Simple and Effective Guide toWriting Well. Sydney: Allen and Unwin, 2004. 2. Buscemi, Santi and Charlotte Smith, 75 Readings Plus. Second Edition New York:McGraw-Hill, 1994. 3. Mohan Krishna C Banerji, Meera: Developing Communication Skills. New Delhi:Macmillan India, 1990.					

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SYLLABUS

PROGRAM: BCA SEMESTER: I WEF: 2024-25

Course Code: AEC-001	Credit: 02	Course: YOGA AND HUMEN COUNCISNES	L: 03 | T: 01 | P: 00

Prerequisites:	Nil
Objectives:	❖ To increase the knowledge of the students about Yoga and to make students ❖ Aware about the holistic development through Yoga. ❖ To provide a practical knowledge on different yogic practices. ❖ To give a glimpse of ancient Yoga Philosophy. ❖ To impart some knowledge about the healing power of Yoga. ❖ To increase the professional efficiency in the field of Yoga
Program Outcome:	Upon successfully finishing the program, students shall be able to:

No.	Course Outcome
CO1	Students gain good knowledge on the concept of yoga.
CO2	Students know about the scientific benefits of various yogic practices
CO3	Students can perform practical skills proficiently
CO4	Students gain an awareness about the value of health & wellness through yoga
CO5	Makes the students more enthusiastic about further study/research in the field of Yoga

Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√		√			√
CO2	√	√		√			√
CO3	√	√					√
CO4	√					√	
CO5	√					√	

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Theory 1 Credit (15 hours)			
No.	**Module Discription**	**BT Level**	**Contact Hours**
I	**Introduction to Yoga:** i. Meaning and definitions of Yoga ii. History of Yoga iii. Importance of Yoga as art, science and philosophy iv. Yogic Diet	U,AP	3
II	**Philosophical Perspective of Yoga:** i. Yoga in Bhagavad Gita: Karma Yoga, Raja Yoga, Jnana Yoga and BhaktiYoga ii. The 'Yoga Sutras' in general; its significance in life. iii. Limbs/parts of yoga (Astanga Yoga) according to the 'Yoga Sutras' iv. Concept of Ishwara; Ishwara in Yoga Philosophy	U,AP	5
III	**Yogic Practices for Health & Wellness:** i. Asana, its classification and effects ii. Pranayama, its types and effects iii. Kriya, Mudra and Bhandha: Procedure and Effects iv. Yoga Vs Physical Exercise	U,AP	3
IV	**Human Consciousness & Meditation** i. Meaning & Definition of Human Consciousness. ii. Need for Study of Human Consciousness. iii. Current Crisis of Human Consciousness & Measures for meaningfulsolution. iv. The Theory of Meditation- Japa Meditation, Ajapajapa Meditation,Yoga Nindra, Tratak.	U,AP	4
V	**Practical** **Suryanamskara** – (12 counts) **i. Asana** **a) Standing**: -Tadasana, Ardhakatichakrasana, Ardhachakrasana, Trikonasana, Vrikshasana. **b) Sitting:** - Vajrasana, Padmasana, Goumukhasana,Paschimottanasana, Shashankasana. **c) Lying Supine Position**: - Shavasana, Setubandhasana, Chakrasana, Sarvangasana, Halasana. **d) Lying Prone Position** - Makarasana, Bhujangasana,Shalabhasana, Dhanurasana, Naukasana. **ii. Pranayama**	U,AP	5

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	Nadishodhana, Suryabhedana, Chandrabhedana, Shitali, Bhastrika, Bhramari. **iii. Bandh & Mudra** Jalandharabandha, Uddiyanbandha, Moolabandha,Yogamudra, Viparitkarnimudra, Shambhavimudra, **V. Dhyana and its forms**		

Course Modules andCourse Outcomes Mapping:	#	Module	Course Outcomes				
			CO1	CO2	CO3	CO4	CO5
	1	Introduction to Yoga:	☑				
	2	Philosophical Perspective of Yoga:		☑			
	3	Yogic Practices for Health & Wellness:			☑		
	4	Human Consciousness & Meditation				☑	
	5	Practical					☑

Text Books/ Reference book	1. Holistic Approach of Yoga- G. Shankar: Aditya Publishers 2. Patanjali's Yoga Sutra – Translation and Commentary-Dr.P.V. Karambelkar: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

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SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2024-25

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

Prerequisites:	Nil		
Objectives:	Familiarize students with the advance programming concepts, logical concept of programming: function, structure, pointer, memory allocation, file handling and data structure etc.		
Course Outcome:	Upon successfully finishing the course, students will have the capability to:		
	No.	**Course Outcome**	**BT Level**
	CO1	Understand the fundamental principles of object-oriented programming, including classes, objects, inheritance, polymorphism, abstraction, and encapsulation.	Understanding, Apply, Analysis
	CO2	Design object-oriented systems with appropriate use of objects and classes. Model real-world problems using OOP concepts like classes, relationships, and behaviors.	Understanding, Apply, Analysis
	CO3	Implement UML (Unified Modeling Language) diagrams (like class diagrams) to represent object-oriented designs.	Understanding, Apply, Analysis
	CO4	Work with advanced features like interfaces, abstract classes, exception handling, and generics (in languages like Java and C++).	Understanding, Apply, Analysis
	CO5	Build software solutions by applying OOP principles to real-world problems. Develop multi-class programs and small projects that demonstrate a strong grasp of object-oriented design and problem-solving.	Understanding, Apply, Analysis

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Program Outcomes and Course Outcomes Mapping:

CourseOutcomes	ProgramOutcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√	√	√				
CO2	√	√	√				
CO3	√	√	√				
CO4	√	√	√				
CO5	√	√	√				

SYLLABUS

No.	Module Description		BT Level	Hours
1	**Introduction to OOP**			10
	1.1	Overview of Programming Paradigms, Procedural vs. Object-Oriented Programming, Benefits of OOP, Real-world modeling using objects and classes.	U,AP,AN	3
	1.2	History and Evolution of OOP, Key figures and languages: Simula, Smalltalk, C++, Java, Python, The rise of OOP in software development	U,AP,AN	3
	1.3	Basic Terminology, Classes, Objects, Methods, Attributes, and Encapsulation, The concept of an Instance, Memory management in OOP languages	U,AP,AN	4
2	**Core Concepts of OOP**			10
	2.1	Classes and Objects, Defining a class, Creating objects (instances of classes), Constructors and destructors, Instance variables vs. class variables	U,AP,AN	3
	2.2	Attributes and Methods, Instance methods vs. class methods, Access modifiers.	U,AP,AN	4
	2.3	Static members (variables and methods) and (private, protected, public modifiers.	U,AP,AN	3
3	**Encapsulation**			12
	3.1.	Definition of Encapsulation, Hiding implementation details, Getters and setters (Accessor and Mutators),Benefits of encapsulation: Information hiding, reduced complexity, modularity	U,AP,AN	4
	3.2.	Data Abstraction, Abstract classes vs. Concrete classes, Abstract methods and their purpose.	U,AP,AN	5

	3.3.	Interfaces and abstract interfaces, Difference between abstract classes and interfaces.	U,AP,AN	4
4	**Inheritance**			**10**
	4.1.	Definition and Overview of Inheritance, Base (Parent) class vs. Derived (Child) class, inheriting methods and attribute.	U,AP	5
	4.2.	Types of Inheritance, Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchical inheritance.	U,AP	5
5	**Polymorphism**			**8**
	5.1.	Use cases of polymorphism (e.g., shape drawing, employee management)	U,AP,AN	4
	5.2.	Benefits of polymorphism in OOP systems	U,AP,AN	4

Course Modules and Course Outcomes Mapping:

#	Module	CourseOutcomes				
		CO1	CO2	CO3	CO4	CO5
1	Introduction to OOP	✓				
2	Core Concepts of OOP		✓			
3	Encapsulation			✓		
4	Inheritance				✓	
5	Polymorphism					✓

Text Books/ Resources:

1."Object-Oriented Design & Programming" by R. P. Jain

2."Object-Oriented Programming in C++" by Robert Lafore

3. "Clean Object-Oriented Programming in Python" by Patrick V. Harbison

Reference Books/ Resources

1."Object-Oriented Programming with C#" by Jesse Liberty and Donald Xie

2. "Programming with Objective-C" by Stephen G. Kochan

3. Java Tutorials: Oracle Java Documentation

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2024-25

Course Code: BCA DSC 05 T	**Credit: 03**	**Course: Relational Database Management System**	**L: 03 | T: 01 | P: 00**
Prerequisites:	Basic concepts of Database Management System		
Objectives:	This course aims to provide a comprehensive understanding of relational database design, transaction processing, and concurrency control. Additionally, it focuses on cultivating proficiency in procedural SQL programming for the creation of database applications.		
Course Outcome:	Upon successfully finishing the course, students will have the capability to:		
	No.	**Course Outcome**	**BT Level**
	CO1	Understanding of Database Fundamentals, Relational Model: Students will understand the foundational concepts of the relational model, including tables, rows, columns, primary keys, foreign keys, and relationships between tables.	Understanding, Analyzing
	CO2	Knowledge of how to design efficient databases using normalization techniques to eliminate redundancy and dependency.	Understanding, Analyzing, Applying
	CO3	Students will learn to write SQL queries to interact with databases retrieving, inserting, updating, and deleting data.	Understanding, Analyzing, Applying
	CO4	Practical Application Real-World Projects: Students will typically work on projects that involve creating, managing, and on exercises, students will learn how to solve practical problems related to data modeling, query design, and performance tuning	Understanding, Analyzing

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	CO5	Understanding students become familiar with database management tools and systems such as MySQL, PostgreSQL, Oracle, SQL Server, and others. They will gain practical skills in using these tools to manage databases effectively.	Understanding, Analyzing

Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	√	√	√	√				
CO2	√	√	√	√				
CO3	√	√	√	√				
CO4	√	√	√	√				
CO5	√	√	√	√				

Syllabus

No.	Module Description		BT Level	Hours
1	Introduction to Databases			**10**
	1.1	Overview of Database Management Systems (DBMS)	Understand	3
	1.2	Types of Databases: Relational, NoSQL, Graph, etc.	Analyze	3
	1.3	Importance of RDBMS in modern applications	Analyze	4
2	**Relational Model Concepts**			**12**
	2.1	Relations, Tuples, Attributes	Apply	2
	2.2	Keys: Primary, Foreign, Candidate, and Super Keys	Apply	3
	2.3	Domain and Integrity Constraints	Apply	3
	2.4	Relational Algebra and Calculus	Apply	4
3	**SQL (Structured Query Language)**			**13**
	3.1.	Basic SQL Commands: SELECT, INSERT, UPDATE, DELETE	Apply	3
	3.2.	Advanced SQL: Joins (INNER, OUTER, SELF, etc.), Subqueries, Views, and Indexing	Apply	3
	3.3.	Transaction Management: COMMIT, ROLLBACK, and SAVEPOINT	Apply	4

	3.4.	Aggregate Functions and Grouping (e.g., COUNT, SUM, AVG)	Apply	3
4	**Normalization and Schema Design**			**10**
	4.1.	Functional Dependency	Understand	3
	4.2.	Normal Forms (1NF, 2NF, 3NF, BCNF, 4NF, 5NF)	Understand	3
	4.3.	ER (Entity-Relationship) Diagrams and their transformation into Relational Schemas	Understand	4
5	**Database Security and Integrity**			**12**
	5.1.	Authentication and Authorization	Understand	4
	5.2.	Data Encryption Techniques	Understand	4
	5.3.	Integrity Constraints: Domain Constraints, Referential Integrity, and Business Rules	Understand	4

Course Modules and Course Outcomes Mapping:

#	Module	CourseOutcomes				
		CO1	**CO2**	**CO3**	**CO4**	**CO5**
1	Relational Database Design	✓				
2	Procedural SQL		✓			
3	Triggers			✓		
4	Transaction Processing				✓	
5	Concurrency Control					✓

Text Books/ Resources:

1. Henry F. Korth, “Database System Concepts”, Tata McGraw Hills
2. Ivan Bayross, MySQL 5.1 for Professionals, 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 Reference https://www.mysqltutorial.org/
4. MySQL Reference Manual - https://dev.mysql.com/doc/refman/8.0/en/

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2024-25

Course Code: BCA DSC 06	Credit: 02	Operating System Concepts	L: 03 | T: 01 | P: 00

Prerequisites:	Nil
Objectives:	To provide a basic understanding of the operating system's function, architecture, services, and underservice coordination. To learn the fundamentals of creating, running, and troubleshooting shell scripts. Discuss the fundamental control structures, variables, and data kinds that are needed to build scripts.
Course Outcome:	Upon successfully finishing the course, students will have the capability to:

No.	Course Outcome	BT Level
CO1	Understanding the concept and Types of Operating Systems, Structure and Functions of OS, and Basics of System software's.	Understand
CO2	Understand the various process states and their transitions, and context switching in managing processes. Demonstrate the different CPU scheduling methods and Concurrency control.	Understand, Analysis
CO3	Determine and understand the concept of memory management, swapping, paging, segmentation, virtual memory management and page replacement algorithms.	Understand
CO4	Understand the concept of concurrency control and deadlock.	Understand
CO5	Understand and apply the concept of file management and secondary storage management	Understand, Apply

Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√		√				
CO2	√	√					
CO3	√		√		√		
CO4	√	√			√	√	
CO5	√		√		√		√

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No.	Module Description		BT Level	Hours
1	**Introduction to Operating Systems**		**Understand**	**5**
	1.1	Definition and functions of an operating system	Understand	1
	1.2	Types of operating systems: batch, time-sharing, real-time, distributed, and embedded	Understand	1
	1.3	System calls and interfaces	Understand	1
	1.4	The role of an OS in a computing environment	Understand	1
	1.5	OS structure: Monolithic, microkernel, and hybrid architectures	Understand	1
2	**Operating System Services**		**Apply, Understand**	**6**
	2.1	Process management and scheduling	Understand	1
	2.2	Memory management	Understand	1
	2.3	File systems	Understand	1
	2.4	I/O management	Understand	1
	2.5	Device drivers	Understand	1
	2.6	Security and protection	Understand	1
3	**Processes and Threads**		**Apply, Understand**	**5**
	3.1.	Concept of processes, threads, and programs	Understand	2
	3.1.	Process state model	Understand	1
	3.2.	Process scheduling and CPU scheduling algorithms	Apply	1
	3.3.	Context switching	Understand	1
	3.4.	Threads: user vs. kernel threads, thread libraries	Apply	1
4	**Process Synchronization and Concurrency**		**Apply, Understand**	**8**
	4.1.	Critical section problem	Understand	2
	4.2.	Synchronization primitives: locks, semaphores, condition variables	Understand	1
	4.3.	Deadlock: conditions, prevention, avoidance, detection, and recovery	Understand	2
	4.4.	Producer-consumer problem	Understand	1

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	4.5.	Readers-writers problem	Understand	2
5	**CPU Scheduling**		**Apply, Understand**	**6**
	5.1.	Scheduling criteria and algorithms: First-Come-First-Served (FCFS), Shortest Job Next (SJN), Round Robin (RR), Priority Scheduling, etc.	Understand	2
	5.2.	Multilevel queue scheduling	Understand	1
	5.3.	Real-time scheduling	Understand	1
	5.4.	Scheduling in multiprocessor systems	Apply, Understand	2

Course Modules and Course Outcomes Mapping:

#	Module	Course Outcomes				
		CO1	CO2	CO3	CO4	CO5
1	Introduction to Operating System	✓				
2	Process Management		✓			
3	Memory Management			✓		
4	Concurrent Control				✓	
5	File and Secondary Management					✓

Textbooks/ Resources:

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

Reference Books/ Resources

1. Tanenbaum A - Modern Operating Systems - Pearson Education.
2. Dhamdhere D. M. – "Operating Systems", Tata McGraw Hill.
3. Sumitabha Das – "UNIX Concepts and Applications", Tata McGraw Hill.
4. Halder S. and Aravind A. – "Operating Systems", Pearson.
5. Shell Programming Reference- https://data-flair.training/blogs/shell-programming-in-linux/

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2024-25

Course Code: BCA SEC 02	**Credit: 02**	**Course: Web Designing**	**L: 03 | T: 01 | P: 00**
Prerequisites:	Nil		
Objectives:	The objective of a Web Design syllabus typically focuses on providing students with the knowledge, skills, and practical experience needed to design and develop visually appealing, user-friendly, and functional websites. The syllabus may cover a range of topics, from the fundamental principles of design to advanced web development techniques.		
Course Outcome:	Upon successfully finishing the course, students will have the capability to:		

No.	Course Outcome	BT Level
CO1	To understand the fundamental principles of web design, such as layout, typography, color theory, and visual hierarchy.	Understand
CO2	Topics: Basic design elements, user-centered design, responsive design, and accessibility considerations.	Understand, Analysis
CO3	HTML, CSS, JavaScript basics, graphic design tools (Photoshop, Illustrator), and web design software (Sketch, Figma).	Understand
CO4	Familiarize students with the essential tools and technologies used in modern web design.	Understand
CO5	To help students create a professional web design portfolio showcasing their skills and projects.	Understand, Apply

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Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√		√				
CO2	√	√	√				
CO3	√		√		√		
CO4	√	√			√	√	
CO5	√		√		√		√

No.	Module Description		BT Level	Hours
1	**Introduction to Web Design**		**Understand**	**5**
	1.1	Overview of Web Design	Understand	1
	1.2	Definition of web design and Web Development	Understand	1
	1.3	web development	Understand	1
	1.4	Web Design Principles	Understand	1
	1.5	Visual hierarchy, Color theory, Typography, Layout and spacing	Understand	1
2	**Basic Web Technologies**		**Apply, Understand**	**5**
	2.1	HTMl , Structure of a webpage, Basic HTML Tags.	Understand	1
	2.2	Formatting tags: headings, paragraphs, lists, links, images	Understand	2
	2.3	Forms and input elements	Understand	1
	2.4	Tables, multimedia (audio, video)	Understand	1
3	**CSS (Cascading Style Sheets)**		**Apply, Understand**	**5**
	3.1.	Basic syntax and selectors	Understand	2
	3.1.	Box model (padding, margin, borders), Colors, fonts, and typography	Understand	1
	3.2.	Layout techniques (floats, positioning, flex box, grid, CSS for responsiveness (media queries	Apply	2
4	**JavaScript Basics (for interactivity)**		**Apply, Understand**	**5**
	4.1.	Introduction to JavaScript	Understand	1

	4.2.	Variables, data types, and operators	Understand	1
	4.3.	Functions, loops, and conditionals	Understand	1
	4.4.	DOM manipulation (Document Object Model)	Understand	1
	4.5.	Event handling (onclick, onhover, etc.)	Understand	1
5	**Web Design Tools & Software**		**Apply, Understand**	**10**
	5.1.	Wireframing & Prototyping Tools	Understand	2
	5.2.	Adobe XD, Figma, Sketch, Balsamiq	Understand	3
	5.3.	Creating wireframes, prototypes, and mockups	Understand	2
	5.4.	Image Editing Tools(Adobe Photoshop, Adobe Illustrator, GIMP) Optimizing images for the web (compression techniques))	Apply, Understand	3

Course Modules and Course Outcomes Mapping:

#	Module	Course Outcomes				
		CO1	**CO2**	**CO3**	**CO4**	**CO5**
1	Introduction to Web Design	✓				
2	Basic Web Technologies		✓			
3	CSS (Cascading Style Sheets)			✓		
4	JavaScript Basics (for interactivity)				✓	
5	Web Design Tools & Software					✓

Textbooks/ Resources:

1."HTML and CSS: Design and Build Websites" by Jon Duckett

2. "Web Design for Developers" by Brian P. Hogan.

Reference Books/ Resources

1."JavaScript and JQuery: Interactive Front-End Web Development" by Jon Duckett

2. "HTML and CSS: Design and Build Websites" by Jon Duckett

3."Designing with Web Standards" by Jeffrey Zeldman

4. Codecademy

5. freeCodeCamp

SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2023-24

Course Code: **BCA AEC 02**	**Credit: 02**	**Course:** Professional Communication Skill	**L: 03 | T: 01 | P: 00**

Prerequisites:	Basic English, computing knowledge, fundamental math, and professional ethics awareness.
Objectives:	Communicate effectively in various professional contexts, Write clear, concise, and professional documents, Use active listening and questioning techniques to enhance communication, Deliver presentations with confidence and clarity. Understand and apply the principles of cross-cultural communication. Utilize technology tools to support professional communication, Navigate professional social interactions and networking scenarios.
Course Outcome:	Upon successfully finishing the course, students will have the capability to:

No.	Course Outcome	BT Level
CO1	Understand the fundamentals and processes of effective communication, its objectives, types, principles, and barriers.	Understand
CO2	Develop skills in body language, active listening, and the written presentation of technical material with proper punctuation.	Understand, Apply
CO3	Acquire proficiency in preparing abstracts, précis writing, meeting agendas and minutes, and internal communication tools.	Understand, Apply
CO4	Develop skills to write various professional correspondence including requisition letters, quotations, acknowledgements, applications, and project proposals.	Apply
CO5	Enhance interview skills, resume writing, project report preparation, and feature write-ups.	Apply

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Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			√				√
CO2	√						√
CO3				√			√
CO4					√		√
CO5						√	√

Syllabus

No.	Module Description		BT Level	Hours
1	**Introduction to Professional Communication**			**4**
	1.1	Definition and Importance of Professional Communication	Understand	1
	1.2	Types of Professional Communication: Verbal, non-verbal, written, and digital	Understand,	2
	1.3	Key Principles of Effective Communication: Clarity, conciseness, coherence, and correctness.	Understand,	1
2	**Interpersonal Communication**			**8**
	2.1	Active Listening and Feedback Techniques	Understand	1
	2.2	Effective Questioning	Understand	2
	2.3	Non-Verbal Communication Skills (Body Language, Facial Expressions)	Understand, Apply	3
	2.4	Building Rapport and Trust in Professional Relationships	Understand, Apply	2
3	**Written Communication**			**8**
	3.1	Business Emails and Memos: Format, tone, and etiquette.	Analyze	2
	3.2	Reports and Proposals: Structure, content, and language.	Understand, Apply	2
	3.3	Resume and Cover Letter Writing: Tailoring documents for different job opportunities.	Analyze	2
	3.4	Social Media and Online Presence in Professional Settings	Understand, Apply	2

4	**Oral Communication in Professional Settings**			**4**
	4.1.	Presentation Skills**:** Planning, structuring, and delivering presentations.	Understand, Apply	2
	4.2.	Public Speaking**:** Overcoming stage fright, voice modulation, and audience engagement.	Understand, Apply	1
	4.3.	Meetings and Conferences**:** Agenda setting, participation, and follow-up.	Understand, Apply	1
5	**Communication in Teamwork and Leadership**			**6**
	5.1	Collaborative Communication in Teams	Apply	1
	5.2	Conflict Resolution and Negotiation Skills	Understand, Apply	1
	5.3	Persuasion and Influence in Leadership	Understand, Apply	1
	5.4	Effective Delegation and Feedback in Professional Teams	Apply	1
	5.5	Using Technology for Remote Communication (Email, Video Conferencing, Instant Messaging)	Apply	1

Course Modules and Course Outcomes Mapping:

#	Module	Course Outcomes				
		CO1	**CO2**	**CO3**	**CO4**	**CO5**
1	Introduction to Professional Communication	✓				
2	Interpersonal Communication		✓			
3	Written Communication			✓		
4	Oral Communication in Professional Settings				✓	
5	Communication in Teamwork and Leadership					✓

Text Books/ Resources:

1. Business Communication – K.K.Sinha.
2. Effective Business communication – Herta.A.Murphy,HERBER.W.
3. Effective Business Communication – AshaKaul.
4. Business Correspondence and report writing – R.C. Sharma and Krishna Menon.
5. Communication Skills – Rajendra Pal, J.S.Korlahalli.

Reference Books/ Resource

1. "Professional Communication: A Reader for Writers and Speakers" by Sara T. Baker
2. "The Business Communication Handbook" by Judith Dwyer.
3. "The Art of Public Speaking" by Stephen E. Lucas.

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SYLLABUS

PROGRAM: BCA SEMESTER: II WEF: 2024-25

Course Code: **BCA VAC 02**	**Credit: 02**	**Course: Environmental Studies**	**L: 03 | T: 01 | P: 00**
Prerequisites:	Nil		
Objectives:	Objective of an environmental study is to understand and analyze the interactions between human activities and the natural environment. It focuses on identifying and addressing environmental problems, with the goal of promoting sustainability, conservation, and a healthy balance between development and nature.		
Course Outcome:	Upon successfully finishing the course, students will have the capability to:		

No.	Course Outcome	BT Level
CO1	Beneficial effects on local ecosystems, communities, or resources.	Understand
CO2	Verification that the proposed activity or project meets local, national, or international environmental standards and regulations (e.g., air and water quality standards, protected species laws).	Understand, Analysis
CO3	Evaluation of potential environmental risks, such as contamination, flooding, climate-related challenges, or biodiversity loss, and how they could be managed.	Understand
CO4	Documentation of public consultations or stakeholder involvement, which may include community feedback, concerns, and suggestions for improving the project's environmental performance.	Understand
CO5	Understand about assessing how the project supports long-term environmental sustainability and community resilience, including energy efficiency, resource conservation, and biodiversity protection.	Understand, Apply

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Program Outcomes and Course Outcomes Mapping:

Course Outcomes	Program Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	√		√				
CO2	√	√	√				
CO3	√		√		√		
CO4	√	√			√	√	
CO5	√		√		√		√

No.	Module Description		BT Level	Hours
1	**Introduction to Environmental Studies**		**Understand**	**10**
	1.1	Definition and scope of Environmental Studies	Understand	1
	1.2	Importance of studying the environment	Understand	2
	1.3	Ecosystem and its components	Understand	2
	1.4	Environmental factors (biotic and abiotic)	Understand	3
	1.5	Environmental awareness and education	Understand	2
2	**Natural Resources and Their Management**		**Apply, Understand**	**5**
	2.1	Classification of natural resources (renewable and non-renewable)	Understand	1
	2.2	Water resources, forest resources, land resources, food resources, energy resources	Understand	1
	2.3	Depletion of natural resources and conservation strategies	Understand	1
	2.4	Sustainable resource management	Understand	1
	2.5	Case studies: Overfishing, deforestation, desertification	Understand	1
3	**Ecosystems and Biodiversity**		**Apply, Understand**	**5**
	3.1.	Concepts of ecosystems: structure and function	Understand	1
	3.1.	Energy flow, food chains, and ecological pyramids	Understand	1
	3.2.	Biodiversity and its significance	Apply	1
	3.3.	Threats to biodiversity: habitat loss, poaching, pollution	Understand	1
	3.4.	Conservation of biodiversity: In-situ and ex-situ conservation methods	Apply	1

4	**Environmental Pollution**		**Apply, Understand**	**5**
	4.1.	Types of pollution: Air, water, soil, noise, and thermal pollution	Understand	1
	4.2.	Causes and effects of pollution on human health and the environment	Understand	1
	4.3.	Global and local pollution issues (e.g., industrial pollution, waste management)	Understand	1
	4.4.	Pollution control measures and technologies	Understand	1
	4.5.	Role of government and international bodies in pollution control (e.g., UN, WHO, EPA)	Understand	1
5	**Climate Change and Global Warming**		**Apply, Understand**	**5**
	5.1.	Greenhouse gases and the greenhouse effect	Understand	2
	5.2.	Impact of global warming on weather patterns, sea levels, and ecosystems	Understand	1
	5.3.	Climate change and its global consequences (extreme weather events, loss of biodiversity, etc.)	Understand	1
	5.4.	International responses to climate change (e.g., Kyoto Protocol, Paris Agreement)	Apply, Understand	1

Course Modules and Course Outcomes Mapping:

#	Module	Course Outcomes				
		CO1	CO2	CO3	CO4	CO5
1	Introduction to Environmental Studies	✓				
2	Natural Resources and Their Management		✓			
3	Ecosystems and Biodiversity			✓		
4	Environmental Pollution				✓	
5	Climate Change and Global Warming					✓

Textbooks/ Resources:

1."Environmental Science: A Global Concern" by William P. Cunningham and Mary Ann Cunningham

2. "Introduction to Environmental Studies" by Andrew S. Light and Jonathan M. H. Law

	3. "Principles of Environmental Science" by William P. Cunningham and Mary Ann Cunningham
Reference Books/ Resources	6. "Environmental Economics: An Introduction" by Barry C. Field and Martha K. Field 7. The Discovery of Global Warming" by Spencer Weart