

**SANJEEV AGRAWAL GLOBAL EDUCATIONAL
UNIVERSITY, BHOPAL**

Academic Program Guide

for

Bachelor of Computer Application (BCA)

**Batch 2023
(Under NEP 2020)**



School of Computer Application

wef 2023-24



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1. Vision and Mission of the School

Vision:

To be a leading Institution by imparting quality education, nurturing Innovation and entrepreneurial attitude to prepare globally competent technocrats.

Mission:

- M1.** To impart quality education in order to meet industry needs and achieve excellence in teaching-learning process.
- M2.** To create an ecosystem that promotes innovation for a sustainable future which leads to entrepreneurship culture.
- M3.** To collaborate with other academic institutes, research institutes and industries to provide state-of-the art latest technological learning.

2. Program Educational Objectives (PEOs)

- PEO1.** To provide student with an academic environment that fosters excellence, transparency, leadership and promote awareness of life-long learning.
- PEO2.** To prepare students to succeed in employment/profession or to pursue postgraduate & research education in Computer Science and Computer Application discipline.
- PEO3.** Help students to practice computer science in a broad range of industries.
- PEO4.** Graduates will make valid judgment, synthesize information from a range of sources and communicate them in sound ways in order to find an economically viable solution.
- PEO5.** To develop overall personality and character with team spirit, professionalism, integrity, and moral values with the support of humanities, social sciences and physical educational courses.

3. Program Outcomes (POs):

- PO1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. Design / Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The Engineer and Society:** Apply reasoning informed by the contextual knowledge to



assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- PO7. Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

4. Program Duration and Eligibility

The duration of B.C.A program is three year / four years (for Honors / Research), divided in six / eight semesters. The student seeking admission in B.C.A should have a minimum aggregate of 60% marks in 12th grade. He/She should have appeared in SEE for that admission year. The admission is based on merit.

5. Curriculum Components and Credits

The various courses prescribed for a program is categorized in terms of their functional objectives as follows:

Discipline Core Courses: Core courses are the foundation courses that cater to develop the breadth of computer science and engineering stream and also includes mathematics, basic science and engineering science courses. Core courses are compulsory and can be offered in any semester during the program tenure.

Discipline Specific Electives: The technical courses apart from core courses are offered as electives to the students. These are the professional courses that are offered to students to cover the depth in a specified area of computer science for their employment, research or higher studies. The student can choose a specialization track to enhance their skills in a particular area and to gain industry exposure.

Interdisciplinary Minor Electives: It is elective courses chosen from other departments and/or schools with an intention to seek exposure in other field of interest.



Ability & Skill Enhancement Courses: These courses help students to perform a particular activity in a very experienced manner can be known as a skill. It improves the ability of an individual to solve a complex task or problem.

Project Based Learning / Projects / Internship: These are hands-on courses to apply the knowledge gained through program core / elective courses. It engages them in solving a real-world problem or answering a complex question. The students identify their team-mates and work on a unique project. The project can be suggested by faculty mentor or by students after getting due approval from faculty-in-charge. The projects are allotted to them at the start of the semester.

MOOC: Students are given a choice of technical and industry-oriented courses to get the knowledge of new technologies. They have an option of choosing the course from any online platforms like NPTEL / SWAYAM / Coursera / Udemy etc.

Credits

Components		Credits
University Core (Table 1)	Ability Enhancement Courses (06 Courses)	12
	Skill Enhancement Courses (06 Courses)	12
Discipline Core Courses (8 Courses) (Table 2)		32
Discipline Specific Major Electives (8+4 Courses) (Table 3)		32R / 48H*
Discipline Specific Minor Electives (6 Courses) (Table 3)		24
Interdisciplinary Minor Electives (04 Courses) (Table 4)		16
Project/Field Internship/Skill Based Project		44R / 28H*
Total		172

Distribution of credits across all components

Sem	Ability & Skill Enhancement		Discipline Core	Discipline Specific Elective		Inter-disciplinary Minor Elective	Project / Internship / Research / Industrial Projects	Total
	AEC	SEC		Major	Minor			
I	2	2	4	4	4	4	3 (PBL)	23
II	2	2	4	4	4	4	3 (PBL)	23
III	2	2	4	4	4	4	3 (PBL)	23
IV	2	2	4	4	4	4	3 (PBL)	23
V	2	2	-	4+4	4		4 (SIP)	20
VI	2	2	-	4+4	4		4 (Minor Project)	20
VII			12				8 (Major)	20
VIII			4	16*			16* (Research / Internship / Project)	20 (4+16*)
Total	12	12	32	32R/48H*	24	16	44R/28H*	172

* Opt either 04 Specialized Courses (For Honor Degree) or Research Based Industrial Project (For Research Degree)

** Note: Any student opting out after I year / II year will obtain undergraduate Certificate/Diploma respectively in the specific discipline subject to mandatory 450hrs (8-10 week) ,10 credit Internship in SUB/Industry/Research organization.

Note: AEC- Ability Enhancement Courses, SEC- Skill Enhancement Courses, PBL- Project Based Learning, SIP- Summer internship Project

6. Assessment and Evaluation

The evaluation will be continuous and the weightage of various components is as given in tables specified for each type of course.

Program Core / Program Electives / Specialization / Ability & Skill Development Courses:

Theory Courses		Lab Courses	
Mid Semester Exam	20	Continuous Assessment	20
Quizzes / Assignments	05	End Semester Exam	30
Teachers Component	05		
Attendance	10		
End Semester Exam	60		
Total	100	Total	50

Project Based Learning / Summer Internship / MOOC:

Continuous Assessment	40
End Semester Exam	60
Total	100

Projects:

Major Project		Research Project	
Continuous Assessment	100	Continuous Assessment	200
Pre-Submission	50	Pre-Submission	100
End Semester Exam	50	End Semester Exam	100
Total	200	Total	400

7. Grading System

The list of letter grades is given below:

Percentage	Letter Grade	Grade Point	Performance Indicator
90 – 100	O	10	Outstanding
80 – 89.9	A	9	Excellent
70 – 79.9	B	8	Good
60 – 69.9	C	7	Fair
50 – 59.9	D	6	Average
40 – 49.9	E	5	Satisfactory
0 – 39.9	F	0	Fail
	DB	0	Debarred
	AB	0	Absent
	WH	0	Withheld



Calculation of SGPA and CGPA

$$SGPA = \frac{\sum C_i G_i}{\sum C_i},$$

Where C_i is credit for each course and G_i is the grade point obtained by the student in that course

$$CGPA = \frac{\sum C_i S_i}{\sum C_i},$$

Where C_i is the total credits for each semester and S_i is the SGPA of that semester

8. Eligibility to Award the Degree

- Student shall be eligible for award of degree subject to passing all the semesters.
- Award of division shall be made only on completion of the program
 - First Division with Distinction – if CGPA is greater than or equal to 8.0
 - First Division – if CGPA is less than 8.0 and greater than or equal to 6.5
 - Second Division – if CGPA is less than 6.5 and greater than or equal to 5.0
- Merit list shall comprise of 10% of the program intake with maximum of 10 students who pass in first division and passing each semester in the first attempt only.

9. Rules for Attendance

The University expects its students to be regular in attending the classes. 75% attendance (of all held sessions – lectures, tutorials, labs, projects) is compulsory in a course to be eligible to appear for End Semester Examination. The students are also encouraged for participation in co-curricular activities and can do so in 25% cushion provided in the attendance requirements.

10. Program Scheme

BCA FIRST SEMESTER wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT	
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT		
							MSE	ASG	TA	ATTD	ToT							
Refer Table 1	AEC				2	Refer Table 1												100
Refer Table 1	SEC				2	Refer Table 1												100
CA23DC001	Mathematics	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100	
Refer Table 3	DSE Major Track – I				4	Refer Table 3												150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3												150
Refer Table 4	Interdisciplinary Minor Elective Track				4	Refer Table 4												100
CA23PR001	Project Based Learning –I	-	-	6	3	2	-	-	-	-	-	-	-	40	60	100	100	
		Total			23													850

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total



BCA SECOND SEMESTER wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT	
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT		
							MSE	ASG	TA	ATTD	ToT							
Refer Table 1	AEC				2	Refer Table 1												100
Refer Table 1	SEC				2	Refer Table 1												100
CA23DC002	Data Structure and Algorithms	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150	
Refer Table 3	DSE Major Track – I				4	Refer Table 3												150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3												150
Refer Table 4	Interdisciplinary Minor Elective Track				4	Refer Table 4												100
CA23PR002	Project Based Learning –II	-	-	6	3	2	-	-	-	-	-	-	-	40	60	100	100	
		Total			23													850

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total

Note: Those students who would like to exit after 1st year and want to obtain Undergraduate Certificate in Performing Arts have to complete mandatory Research internship at SUB/Industry/Research Organization for 450 hours to be completed in 8-10 weeks.



BCA THIRD SEMESTER wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT	
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT		
							MSE	ASG	TA	ATTD	ToT							
Refer Table 1	AEC				2	Refer Table 1												100
Refer Table 1	SEC				2	Refer Table 1												100
CA23DC003	Database Management System	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150	
Refer Table 3	DSE Major Track – I				4	Refer Table 3												150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3												150
Refer Table 4	Interdisciplinary Minor Elective Track				4	Refer Table 4												100
CA23PR003	Project Based Learning –III	-	-	6	3	2	-	-	-	-	-	-	-	40	60	100	100	
		Total			23													850

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total



BCA FOURTH SEMESTER wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT	
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT		
							MSE	ASG	TA	ATTD	ToT							
Refer Table 1	AEC				2	Refer Table 1												100
Refer Table 1	SEC				2	Refer Table 1												100
CA23DC004	Software Engineering	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150	
Refer Table 3	DSE Major Track – I				4	Refer Table 3												150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3												150
Refer Table 4	Interdisciplinary Minor Elective Track				4	Refer Table 4												100
CA23PR004	Project Based Learning –IV	-	-	6	3	2	-	-	-	-	-	-	-	40	60	100	100	
		Total			23													850

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total

Note: Those students who would like to exit after 2nd year and want to obtain Undergraduate Diploma in Performing Arts have to complete mandatory Research internship at SUB/Industry/Research Organization for 450 hours to be completed in 8-10 weeks.



BCA FIFTH SEMESTER wef 2023-24 onwards																	
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT	
							MSE	ASG	TA	ATTD	ToT						
Refer Table 1	AEC				2	Refer Table 1											100
Refer Table 1	SEC				2	Refer Table 1											100
Refer Table 3	DSE Major Track – I				4	Refer Table 3											150
Refer Table 3	DSE Major Track – I				4	Refer Table 3											150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3											150
CA23PR005	Summer Internship / Field Activity	-	-	8	4	3	-	-	-	-	-	-	-	40	60	100	100
		Total			20												750

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total

BCA SIXTH SEMESTER wef 2023-24 onwards																	
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT	
							MSE	ASG	TA	ATTD	ToT						
Refer Table 1	AEC				2	Refer Table 1											100
Refer Table 1	SEC				2	Refer Table 1											100
Refer Table 3	DSE Major Track – I				4	Refer Table 3											150
Refer Table 3	DSE Major Track – I				4	Refer Table 3											150
Refer Table 3	DSE Minor Track – II				4	Refer Table 3											150
CA23PR006	Minor Project	-	-	8	4	3	-	-	-	-	-	-	-	40	60	100	100
		Total			20												750

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total

Note: Those who would like to continue their studies in fourth year for obtaining degree of Honors/Research should have completed all the courses up to third year and obtained a minimum CGPA of 7.5.



BCA SEVENTH SEMESTER wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							CE^	Weightage (Practical)			GT
		L	T	P			Internal Assessment (IA)					ESE	GT		ESE		ToT	
							MSE	ASG	TA	ATTD	ToT				Pre Sub	Viva Voce		
SC23UC013	Intellectual Property Right & Research Publication Ethics	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	-	100
CA23UC014	Seminar / Publication	-	-	8	4	3	-	-	-	-	-	-	-	40	-	60	100	100
MG23UC015	Project Management	3	1	-	4	3	20	05	05	10	40	60	100	-	-	-	-	100
CA23PR007	Major Project	-	-	16	8	3	-	-	-	-	-	-	-	100	50	50	200	200
		Total			20													500

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total



BCA EIGHTH SEMESTER (Honors) wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT	
		L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT		
							MSE	ASG	TA	ATTD	ToT							
CA23MO001	MOOCs	-	-	8	4	3	-	-	-	-	-	-	-	40	60	100	100	
Refer Table 3	DSE Track – I				4	Refer Table 3												100
Refer Table 3	DSE Track – I				4	Refer Table 3												100
Refer Table 3	DSE Track – I				4	Refer Table 3												100
Refer Table 3	DSE Track – I				4	Refer Table 3												100
		Total			20													500

BCA EIGHTH SEMESTER (Research) wef 2023-24 onwards																		
Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							CE^	Weightage (Practical)			GT
		L	T	P			Internal Assessment (IA)					ESE	GT		ESE		ToT	
							MSE	ASG	TA	ATTD	ToT				Pre Sub	Viva Voce		
CA23MO001	MOOCs	-	-	8	4	3	-	-	-	-	-	-	-	40	-	60	100	100
CA23PR008	Research Project / Internship	-	-	32	16	3	-	-	-	-	-	-	-	200	100	100	400	400
		Total			20													500

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, MSE- Mid Semester Exam, ASG- Assignment, TA- Teacher's Assessment, ATTD- Attendance, ToT- Total, CE- Continuous Evaluation, GT- Grand Total

Table I
Groups for UC Courses
2023-24 onwards

GROUP A	School of Management, School of Commerce, School of Arts Humanities and Social Sciences, School of Law and Legal Studies, School of Performing Arts, School of Journalism and Mass Communication, School of Design.
GROUP B	School of Sciences, SIRT- Pharmacy , SAGE College of Nursing , School of Computer Application , School of Advanced Computing, School of Engineering and Technology, School of Agriculture

GROUP B

Semester	Course Code	Course Title	Type	Contact Hours			Credits	ESE Duration	Weightage (Theory)							Weightage (Practical)			GT
				L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT	
									MSE	ASG	TA	ATTD	ToT						
I	TR23UC003	Communication Skills	AEC	1	0	2	2	3	10	03	02	05	20	30	50	20	30	50	100
	CA23UC004	MS Office	SEC	0	0	4	2	3	-	-	-	-	-	-	-	40	60	100	100
II	SC23UC001	Environmental Studies and Disaster Management	AEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
	AH23UC002	Hindi	SEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
III	TR23UC007	Quantitative Aptitude and Logical Reasoning	AEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
	ET23UC008	Design and Critical Thinking	SEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
IV	TR23UC005	Professional Skills-I	AEC	0	0	4	2	3	-	-	-	-	-	-	-	40	60	100	100
	MG23UC006	Entrepreneurship Development	SEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
V	CM23UC011	Financial Literacy & Banking	AEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
	AH23UC012	Indian Culture and Human Values	SEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100
VI	TR23UC009	Professional Skills- II	AEC	0	0	4	2	3	-	-	-	-	-	-	-	40	60	100	100
	MG23UC010	Research Methodology	SEC	2	0	0	2	3	20	05	05	10	40	60	100	-	-	-	100

Table: 2
Discipline Core Courses
2022-23 onwards

Semester	Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)						Weightage (Practical)			GT	
			L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE		ToT
								MSE	ASG	TA	ATTD	ToT						
I	CA23DC001	Mathematics	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
II	CA23DC002	Data Structure and Algorithms	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
III	CA23DC003	Database Management System	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
IV	CA23DC004	Software Engineering	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150



Table: 3
Discipline Specific Electives (DSE)
(Select one Major and one Minor)
2022-23 onwards

Semester	Cloud Computing (Major)	Data Science (Major)	Cyber Security (Minor)	Artificial Intelligence (Minor)
I	Introduction to Cloud Computing and Data Center	Introduction to Data Science and Artificial Intelligence	Cyber Security Attacks and Defense Strategies	Knowledge Representation and Logic Programming
II	Principles of Virtualization	Probability and Statistic	Data Communication and Computer Networks	Computer Networks
III	Cloud Web Services	Inferential Statistics using R Programming	Cryptography and Network Security	Digital Image Processing
IV	Windows Administration	Python libraries for Data Science	Linux Administration	Artificial Neural Networks
V	Infrastructure Solutions on Cloud	Big Data Analytics	Ethical Hacking	NoSQL Databases
	Cloud Security	Data Visualization		
VI	Server-side Scripting	Numerical Methods and Optimization Techniques	Cyber Forensics and Investigation	Natural Language Processing
	Building Scalable Web Application	Machine Learning		
VIII	Cloud Migration	Sampling Methods		
	Developing Applications on Cloud	Time Series Analysis and Forecasting		
	Server less Computing	Deep Learning		
	DevOps on Cloud	Computer Vision		



Table: 3.1

Major Track: Cloud Computing

Semester	Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)						Weightage (Practical)			GT	
			L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE		ToT
								MSE	ASG	TA	ATTD	ToT						
I	CA23CC001	Introduction to Cloud Computing and Data Center	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
II	CA23CC002	Principles of Virtualization	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
III	CA23CC003	Cloud Web Services	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
IV	CA23CC004	Windows Administration	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
V	CA23CC005	Infrastructure Solutions on Cloud	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
	CA23CC006	Cloud Security	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VI	CA23CC007	Server-side Scripting	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
	CA23CC008	Building Scalable Web Application	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VIII	CA23CC009	Cloud Migration	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23CC010	Developing Applications on Cloud	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23CC011	Server less Computing	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23CC012	DevOps on Cloud	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100



Table: 3.2

Major Track: Data Science

Semester	Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)						Weightage (Practical)			GT	
			L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE		ToT
								MSE	ASG	TA	ATTD	ToT						
I	CA23DS001	Introduction to Data Science and Artificial Intelligence	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
II	CA23DS002	Probability and Statistic	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
III	CA23DS003	Inferential Statistics using R Programming	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
IV	CA23DS004	Python libraries for Data Science	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
V	CA23DS005	Big Data Analytics	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
	CA23DS006	Data Visualization	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VI	CA23DS007	Numerical Methods and Optimization Techniques	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
	CA23DS008	Machine Learning	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VIII	CA23DS009	Sampling Methods	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23DS010	Time Series Analysis and Forecasting	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23DS011	Deep Learning	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100
	CA23DS012	Computer Vision	4	-	-	4	3	20	05	05	10	40	60	100	-	-	-	100

Table: 3.3

Minor Track: Cyber Security

Semester	Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)							Weightage (Practical)			GT
			L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE	ToT	
								MSE	ASG	TA	ATTD	ToT						
I	CA23CY001	Cyber Security Attacks and Defense Strategies	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
II	CA23CY002	Data Communication and Computer Networks	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
III	CA23CY003	Cryptography and Network Security	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
IV	CA23CY004	Linux Administration	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
V	CA23CY005	Ethical Hacking	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VI	CA23CY007	Cyber Forensics and Investigation	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150

Table: 3.4

Minor Track: Artificial Intelligence

Semester	Course Code	Course Title	Contact Hours per Week			Credits	ESE Duration (Hours)	Weightage (Theory)						Weightage (Practical)			GT	
			L	T	P			Internal Assessment (IA)					ESE	GT	CE^	ESE		ToT
								MSE	ASG	TA	ATTD	ToT						
I	CA23AI001	Knowledge Representation and Logic Programming	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
II	CA23AI002	Computer Networks	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
III	CA23AI003	Digital Image Processing	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
IV	CA23AI004	Artificial Neural Networks	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
V	CA23AI005	NoSQL Databases	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150
VI	CA23AI007	Natural Language Processing	3	-	2	4	3	20	05	05	10	40	60	100	20	30	50	150

Table 4: Interdisciplinary Minor Elective Courses

(Select any one track)
2023-24 Onwards

S. No	Name of the Offering School	Minor Specialization Track	Minor Elective	Code	Course	Contact Hours / Week			Credits	Theory						Practical			GT
						L	T	P		MSE	ASG	TA	ATTD	ESE	Total	CE	ESE	Total	
1	School of Engineering & Technology	Digital Marketing	I	ET23DM001	Web Development Fundamentals	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			II	ET23DM002	Introduction to Digital Marketing	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			III	ET23DM003	Search Engine Optimization and Social Media Marketing	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			IV	ET23DA004	Web Analytics	2	0	4	4	10	03	02	05	30	50	20	30	50	100
		Data Analytics	I	ET23DA001	Data Analytics Fundamentals	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			II	ET23DA002	Business Analytics	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			III	ET23DA003	R Programming	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			IV	ET23DA004	Data Visualization	2	0	4	4	10	03	02	05	30	50	20	30	50	100
		Web Designing	I	ET23WD001	Web Designing Fundamentals	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			II	ET23WD002	Dynamic Website with JavaScript	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			III	ET23WD003	Introduction to XML	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			IV	ET23WD004	Web Application Development	2	0	4	4	10	03	02	05	30	50	20	30	50	100
		Programming	I	ET23PR001	Core Java	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			II	ET23PR002	Advanced Java	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			III	ET23PR003	Python Programming	2	0	4	4	10	03	02	05	30	50	20	30	50	100
			IV	ET23PR004	Web Application Development	2	0	4	4	10	03	02	05	30	50	20	30	50	100
2	School of Arts Humanities and Social Sciences	Tours & Travel Management	I	AH23TT001	Hospitality Etiquettes	2	0	4	4							40	60	100	100
			II	AH23TT002	World Heritage Sites of MP	2	0	4	4							40	60	100	100
			III	AH23TT003	Medical Tourism	2	0	4	4							40	60	100	100
			IV	AH23TT004	International Travel Assistance	2	0	4	4							40	60	100	100
3	School of Sciences	Laboratory Management	I	SC23LM001	Microbio & Biotech Lab. Skills	0	0	8	4							40	60	100	100
			II	SC23LM002	Chemistry Lab Skills	0	0	8	4							40	60	100	100
			III	SC23LM003	Electronics & Electrical Lab Skills	0	0	8	4							40	60	100	100
			IV	SC23LM004	Physics Lab Skills	0	0	8	4							40	60	100	100
4	School of Agriculture	Horticulture	I	AG23HR001	Production Technology for Vegetable and Spices	0	0	8	4							40	60	100	100
			II	AG23HR002	Production Technology for Fruit and Plantation Crops	0	0	8	4							40	60	100	100
			III	AG23HR003	Diseases of Field and Horticultural Crops and their Management–I	0	0	8	4							40	60	100	100
			IV	AG23HR004	Diseases of Field and Horticultural Crops and their Management–II	0	0	8	4							40	60	100	100

		Agri Business	I	AG23AB001	Agricultural Finance and Cooperation	0	0	8	4							40	60	100	100
			II	AG23AB002	Agricultural Marketing Trade & Prices	0	0	8	4							40	60	100	100
			III	AG23AB003	Entrepreneurship Development and Business Communication	0	0	8	4							40	60	100	100
			IV	AG23AB004	Farm Management, Production & Resource Economics	0	0	8	4							40	60	100	100
5	School of Commerce & Management	Basic Accounting Skills	I	CM23BA001	Financial Accounting	4	0	0	4							40	60	100	100
			II	CM23BA002	Tally	3	0	2	4							40	60	100	100
			III	CM23BA003	Personal Taxation	4	0	0	4							40	60	100	100
			IV	CM23BA004	Direct and Indirect Taxes	4	0	0	4							40	60	100	100
		Retail Management & Merchandising	I	MG23RM001	Retail Management	4	0	0	4							40	60	100	100
			II	MG23RM002	Merchandising	4	0	0	4							40	60	100	100
			III	MG23RM003	Supply Chain Management	4	0	0	4							40	60	100	100
			IV	MG23RM004	E Business	4	0	0	4							40	60	100	100
		Office Management Skills	I	MG23OM001	Office Communication Skills	3	0	2	4							40	60	100	100
			II	MG23OM002	Official Correspondence	4	0	0	4							40	60	100	100
			III	MG23OM003	File Maintenance	3	0	2	4							40	60	100	100
			IV	MG23OM004	Advanced MS Excel	3	0	2	4							40	60	100	100
		Event Management	I	MG23EM001	Introduction and Strategy of Event Management	4	0	0	4							40	60	100	100
			II	MG23EM002	Classification of Events	4	0	0	4							40	60	100	100
			III	MG23EM003	Structure and Planning of Events	4	0	0	4							40	60	100	100
			IV	MG23EM004	Brand Orientation & Event Promotion	4	0	0	4							40	60	100	100
		Investment Management	I	MG23IM001	Introduction to Financial Markets	4	0	0	4							40	60	100	100
			II	MG23IM002	Fundamental & Technical Analysis of Investment	4	0	0	4							40	60	100	100
			III	MG23IM003	Risk Management	4	0	0	4							40	60	100	100
			IV	MG23IM004	Introduction to Derivatives	4	0	0	4							40	60	100	100
6	School of Design	Sketching & Painting	I	DN23SP001	Sketching-I	0	0	8	4							40	60	100	100
			II	DN23SP002	Sketching-II	0	0	8	4							40	60	100	100
			III	DN23SP003	Painting-I	0	0	8	4							40	60	100	100
			IV	DN23SP004	Painting-II	0	0	8	4							40	60	100	100
		Interior Design	I	DN23ID001	Building Materials & Processes	0	0	8	4							40	60	100	100
			II	DN23ID002	Elements of Interior Spaces	0	0	8	4							40	60	100	100
			III	DN23ID003	Basics of Lighting Design	0	0	8	4							40	60	100	100
			IV	DN23ID004	Building Services	0	0	8	4							40	60	100	100
		Apparel Design	I	DN23AD001	Fashion Illustration-I	0	0	8	4							40	60	100	100
			II	DN23AD002	Dyeing and Printing Techniques	0	0	8	4							40	60	100	100
			III	DN23AD003	Surface Exploration-I	0	0	8	4							40	60	100	100
			IV	DN23AD004	Surface Exploration-II	0	0	8	4							40	60	100	100
7	School of Performing Arts	Dance	I	PA23DN001	Techniques and Theatrical Performance of Dance-I	0	0	8	4							40	60	100	100

			II	PA23DN002	Techniques and Theatrical Performance of Dance–II	0	0	8	4							40	60	100	100
			III	PA23DN003	Techniques and Theatrical Performance of Dance–III	0	0	8	4							40	60	100	100
			IV	PA23DN004	Techniques and Theatrical Performance of Dance–IV	0	0	8	4							40	60	100	100
		Music	I	PA23MC001	Musical Roots and Theatrical Performance I	0	0	8	4							40	60	100	100
			II	PA23MC002	Musical Roots and Theatrical Performance II	0	0	8	4							40	60	100	100
			III	PA23MC003	Musical Roots and Theatrical Performance III	0	0	8	4							40	60	100	100
			IV	PA23MC004	Musical Roots and Theatrical Performance IV	0	0	8	4							40	60	100	100
		Theatre	I	PA23TR001	Basics of Acting Production I	0	0	8	4							40	60	100	100
			II	PA23TR002	Drama Production II	0	0	8	4							40	60	100	100
			III	PA23TR003	Drama Production III	0	0	8	4							40	60	100	100
			IV	PA23TR004	Drama Production IV	0	0	8	4							40	60	100	100
8	School of Journalism and Mass Communication	Basic Media Production Techniques	I	JM23MP001	Photography	0	0	8	4							40	60	100	100
			II	JM23MP002	Videography	0	0	8	4							40	60	100	100
			III	JM23MP003	Script Writing	0	0	8	4							40	60	100	100
			IV	JM23MP004	Audio Visual Editing	0	0	8	4							40	60	100	100
		Advertising and Public Relations	I	JM23AP001	Introduction to Advertising	0	0	8	4							40	60	100	100
			II	JM23AP002	Content Creation	0	0	8	4							40	60	100	100
			III	JM23AP003	Introduction to Public Relations	0	0	8	4							40	60	100	100
			IV	JM23AP004	Tools and Techniques of Public Relations	0	0	8	4							40	60	100	100
9	SIRT-P/ Sage College of Nursing	Health Management	I	PH23HM001	Health Care Management	0	0	8	4							40	60	100	100
			II	PH23HM002	Good Medication Practices	0	0	8	4							40	60	100	100
			III	PH23HM003	Good Nursing Practices	0	0	8	4							40	60	100	100
			IV	PH23HM004	Life Saving Skills- In case of emergency	0	0	8	4							40	60	100	100
10	School of Advanced Computing	Advanced Programming	I	AC23AP001	Programming Practice using C	3	0	2	4	10	03	02	05	30	50	20	30	50	100
			II	AC23AP002	Operating System	3	0	2	4	10	03	02	05	30	50	20	30	50	100
			III	AC23AP003	Object Oriented Programming using Python	3	0	2	4	10	03	02	05	30	50	20	30	50	100
			IV	AC23AP004	Web Technologies	3	0	2	4	10	03	02	05	30	50	20	30	50	100