GM UNIVERSITY

PROGRAM DOCUMENT

2023 SCHEME

I-VIII SEMESTER

B.Tech in
CS-Cloud Computing

GM UNIVERSITY
Innovating Minds

School of Computer Science & Technology
Faculty of Engineering & Technology

B.Tech. - Computer Science- Cloud Computing

Program Details

Faculty	Engineering and Technology (FET)
School	School of Computer Science and Technology (SCST)
Department	Computer Science- Cloud Computing
Program	B.Tech., Computer Science- Cloud Computing
Senior Dean of Faculty	
Dean of Faculty	
Director of School	Dr. Sanjay Pande M.B.
Head of Department	Dr. Shankarayya Shastri

1.	**Title of the Award**	B.Tech. in Computer Science- Cloud Computing
2.	**Modes of Study**	Full Time
3.	**Awarding Institution /Body**	GM University
4.	**Joint Award**	Not Applicable
5.	**Teaching Institution**	Faculty of Engineering and Technology, GM University
6.	**Date of Program Specifications**	November -2023
7.	**Date of Course Approval by the Academic Council of GMU**	---
8.	**Next Review Date:**	---
9.	**Program Approving Regulating Body and Date of Approval**	---
10.	**Program Accredited Body and Date of Accreditation**	---
11.	**Grade Awarded by the Accreditation Body**	---
12.	**Program Accreditation Validity**	---
13.	**Program Benchmark**	N/A

14.	**Program Overview for Computer Science-Cloud Computing** The Bachelor's program in Computer Science and Cloud Computing (B.Tech. Computer Science and Cloud Computing) offers a comprehensive and innovative education for students aspiring to excel in the dynamic field of computer science, with a specific focus on cloud computing technologies. This program is meticulously designed to provide students with a strong foundation in both theoretical principles and practical applications of computer science, fostering a deep understanding of creative problem-solving, software design, and cutting-edge cloud computing technologies. Over the course of four years, students engage in a well-structured curriculum that seamlessly integrates core engineering principles with specialized courses in computer science and cloud computing. The program adopts a hands-on approach, incorporating software projects, system design, and internships to enable students to apply theoretical knowledge to real-world challenges in computer science and cloud computing. Key areas of study include programming principles, algorithms, data structures, artificial intelligence, machine learning, software development methodologies, computer networks, and advanced cloud computing techniques. Students gain proficiency in using state-of-the-art programming languages, development tools, and simulation software, preparing them for the challenges of the contemporary computer science and cloud computing industry. The B.Tech. Computer Science and Cloud Computing program aim to equip graduates for diverse career opportunities across various sectors, with a particular emphasis on cloud-based technologies and solutions. Potential career paths encompass roles in technology companies, cloud service providers, research and development, and entrepreneurship within the computer science domain. The interdisciplinary nature of computer science and cloud computing opens avenues to explore diverse applications, enabling graduates to contribute to advancements in technology, software solutions, and the development of scalable and efficient cloud-based systems. Continuous learning and staying abreast of the latest industry trends are crucial for graduates to thrive in the rapidly evolving field of computer science and cloud computing. The program spans eight semesters, providing a holistic education that prepares students for a successful and impactful career in the dynamic realm of

	computer science and cloud computing innovation.
15.	**Program Educational Objectives (PEOs) for Computer Science-Cloud Computing** **PEO-1: Knowledge and Technical Skills** The Bachelor's program in Computer Science and Cloud Computing aims to provide graduates with a solid foundation in computer science and engineering principles, covering algorithms, data structures, artificial intelligence, and machine learning. Upon completion, graduates will possess the knowledge and technical skillsnecessary to analyze, design, implement, and optimize software systems and intelligent solutions. They will be well-equipped to address real-world challenges, particularly in the context of cloud computing, ensuring efficient and scalable cloud-based applications and services. **PEO-2: Professional Competence and Leadership** To instill technical competencies, practical skills, and leadership abilities in graduates, preparing them for success in the dynamic and evolving field of computer science and cloud computing. Graduates will excel in roles within technology companies, cloud service providers, research and development, and entrepreneurial ventures within the computer science domain. They will be capable of assuming both technical and leadershippositions, contributing to advancements in cloud-based technologies and innovation. **PEO-3: Holistic Development and Adaptability** The program aims to nurture critical thinking, creativity, innovation, collaboration, effective communication, information literacy, flexibility, adaptability, leadership, responsibility, and social and cross-cultural interactionskills. Graduates will demonstrate the ability to adapt to evolving professional environments, ensuring they contribute effectively to the dynamic and challenging field of computer science and cloud computing. The interdisciplinary nature of the program prepares graduates for diverse career trajectories, fostering holistic development and lifelong learning. The overarching goal of the B.Tech. in Computer Science and Cloud Computing is to produce graduates who are well-prepared to meet the challenges of the dynamic computer science and cloud computing industry, contribute to technological advancements, and make a positive impact on the development and implementation of cloud-based systems and services.
16.	**Program Outcomes (POs) (Graduate Attributes)** **PO-1:** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, andan engineering specialization to the solution of complex engineering problems. **PO-2:** 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. **PO-3:** 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 publichealth and safety, and the cultural, societal, and environmental considerations. **PO-5:** 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. **PO-6:** 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. **PO-7:** 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. **PO-8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **PO-9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. **PO-10:** 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. **PO-11:** Project management and finance: Demonstrate knowledge and understanding of the engineering andmanagement principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. **PO-12:** Lifelong 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.
17.	**Program Specific Outcomes (PSOs):** **PSO-1: Analyze and Address Cloud Computing Challenges** Graduates will demonstrate the ability to analyze complex computational requirements specific to cloud computing, identify challenges related to scalability, security, and efficiency, and articulate problems with necessary specifications. Leveraging their

	understanding of computer science principles within the cloud computing context, graduates will deliver innovative solutions, addressing issues related to the development and optimization of cloud-based applications and services **PSO-2: Apply Cloud Computing Concepts in System Development** Graduates will be equipped to envision, model, design, implement, and test scalable and efficient software systems and computational solutions in the context of cloud computing. They will demonstrate proficiency in addressing technical challenges within the field of computer science and cloud computing, utilizing their knowledge of algorithms, data structures, and cloud computing architectures to create applications that leverage the benefits of cloud-based technologies. **PSO-3: Conduct and Lead Experimental Validation in Cloud Computing** After completing the program, graduates will showcase the capability to strategize, coordinate, and execute experiments for the validation and verification of cloud computing systems and solutions. They will adeptly use laboratory techniques and software tools for designing and simulating scalable computational processes in the cloud, emphasizing the importance of efficiency and reliability. Graduates will be prepared to assume leadership roles in research projects, effectively managing teams and resources in the context of computer science and cloud computing. These Program Specific Outcomes are tailored to ensure that graduates are not only well-versed in the theoretical aspects of computer science and engineering but also possess the practical skills and leadership qualities required to make meaningful contributions in the specialized field of computer science and cloud computing. The outcomes emphasize the application of computer science principles in addressing real- world challenges and the development of innovative and scalable solutions in the realm of cloud computing.

Programme Structure

18. **Definition of Credit**:

1 Hr. Lecture (L) per week	1 Credit
2 Hr. Tutorial (T) per week	1 Credit
2 Hr. Practical (P) per week	1 Credit

Sl.No.	**Program -Category**	**Credits**
1.	Program-Core courses, elective Courses, open electives	130
2.	Technical Competency	10 (SDTCD)
3.	Life Skills	3(CASP)
4.	Innovation and Entrepreneurial Skills	3(CIPI)
5.	Environmental Awareness and Community Services	3(SA)
6.	Athletics, Sports, Yoga, Gymnasium	3(SA)
7.	Cultural & Literary Activities	3(SA)
8.	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	2(SA&SP)
9.	Placement Training	3(CASP)
	Total	**130+30=160**

18. Courses and Credits:

Semester-1			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS1101	Foundational Mathematics for Computer Science	3
2.	UE23CS1102	Analog & Digital Fundamentals	3
3.	UE23CS1103	Advanced Materials Integration in Computing Technology	3
4.	UE23CS1104	Problem Solving through C Programming	3
5.	UE23CS1105	Web Designing & Programming	3
6.	UE23CS1106	Project Based Learning / mini project on Web Designing	2
7.	SDTCD	Technical Competency	0
8.	CASP	Life Skills	0
9.	CIBI	Innovation and Entrepreneurial Skills	0
10.	SA	Environmental Awareness and Community Services	0
11.	SA	Athletics, Sports, Yoga, Gymnasium	0
12.	SA	Cultural & Literary Activities	0
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
14.	CASP	Placement Training	0
Total			**17**

Semester-2			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS1201	Applied Mathematics for Computer Science	3
2.	UE23CS1202	Applied Physics for CSE	3
3.	UE23CS1203	Data Structures & Algorithms	3
4.	UE23CS1204	Python Programming	3
5.	UE23CS1205	Fundamentals of Computer Networks	3
6.	UE23CS1206	Fundamentals of DBMS	3
7.	UE23CS1207	Project Based Learning / mini project on Computer Networks	2
8.	SDTCD	Technical Competency	2
9.	CASP	Life Skills	1
10.	CIBI	Innovation and Entrepreneurial Skills	0
11.	SA	Environmental Awareness and Community Services	1
12.	SA	Athletics, Sports, Yoga, Gymnasium	0
13.	SA	Cultural & Literary Activities	0
14.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
15.	CASP	Placement Training	0
Total			**24**

Semester-3			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS2301	Algorithm Design and Complexity Analysis	4
2.	UE23CS2302	Internet of Things	3
3.	UE23CS2303	Object Oriented Programming	3
4.	UE23CS2304	Computer Organization and Architecture	3
5.	UE23CS2305	Operating System Concepts	3
6.	UE23CS2306	Project Based Learning	2
7.	SDTCD	Technical Competency	2
8.	CASP	Life Skills	1
9.	CIBI	Innovation and Entrepreneurial Skills	0
10.	SA	Environmental Awareness and Community Services	1
11.	SA	Athletics, Sports, Yoga, Gymnasium	1
12.	SA	Cultural & Literary Activities	0
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
14.	CASP	Placement Training	1
Total			**24**

Semester-4			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS2401	Machine Learning	3
2.	UE23CS2402	Data Mining and Data Ware housing	3
3.	UE23CS2403	Discrete Structures for Computing	2
4.	UE23CS2404	Advanced DBMS and PL/SQL	3
5.	UE23CS2405	Automata Theory and Computations	3
6.	UE23CS2406	Project Based Learning	2
7.	SDTCD	Technical Competency	2
8.	CASP	Life Skills	1
9.	CIBI	Innovation and Entrepreneurial Skills	1
10.	SA	Environmental Awareness and Community Services	1
11.	SA	Athletics, Sports, Yoga, Gymnasium	1
12.	SA	Cultural & Literary Activities	1
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
14.	CASP	Placement Training	1
Total			**24**

Semester-5			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS3501	Advanced Machine Learning	3
2.	UE23CC3502	Cloud Computing and its Applications	3
3.	UE23CC3503	Generative AI	3
4.	UE23CC3504	Data Privacy	3
5.	UE23CC35XX	Professional Elective -1	3
6.	UE23CC3506	Project Based Learning	3
7.	SDTCD	Technical Competency	2
8.	CASP	Life Skills	0
9.	CIBI	Innovation and Entrepreneurial Skills	0
10.	SA	Environmental Awareness and Community Services	0
11.	SA	Athletics, Sports, Yoga, Gymnasium	1
12.	SA	Cultural & Literary Activities	0
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
14.	CASP	Placement Training	1
Total			**22**

Semester-6			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CC3601	Cloud Management and Security	3
2.	UE23CC3602	Full Stack development with mini project	3
3.	UE23CC3603	Big Data and Cloud Data Analytics	3
4.	UE23CC36XX	Professional Elective - 2	3
5.	UE23CC3604	Project Based Learning	3
6.	SDTCD	Technical Competency	2
7.	CASP	Life Skills	0
8.	CIBI	Innovation and Entrepreneurial Skills	1
9.	SA	Environmental Awareness and Community Services	0
10.	SA	Athletics, Sports, Yoga, Gymnasium	0
11.	SA	Cultural & Literary Activities	1
12.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	0
13.	CASP	Placement Training	0
Total			**19**

Semester-7			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS4701	Open Elective -1	2
2.	UE23CS4702	Intellectual Property Rights	3
3.	UE23CS4703	Industry Internship	4
4.	UE23CS4704	Project - 1	4
5.	SDTCD	Technical Competency	0
6.	CASP	Life Skills	0
7.	CIBI	Innovation and Entrepreneurial Skills	0
8.	SA	Environmental Awareness and Community Services	0
9.	SA	Athletics, Sports, Yoga, Gymnasium	0
10.	SA	Cultural & Literary Activities	1
11.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	1
12.	CASP	Placement Training	0
Total			**16**

Semester-8			
S. No.	**Course Code**	**Course Title**	**Credits**
1.	UE23CS4801	Engineering Project Management	3
2.	UE23CS4802	Open Elective -2	2
3.	UE23CS4803	Project - 2	6
4.	SDTCD	Technical Competency	0
5.	CASP	Life Skills	0
6.	CIBI	Innovation and Entrepreneurial Skills	1
7.	SA	Environmental Awareness and Community Services	0
8.	SA	Athletics, Sports, Yoga, Gymnasium	0
9.	SA	Cultural & Literary Activities	0
10.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/TechnicalCompetition)	1
11.	CASP	Placement Training	0
Total			**14**

Professional Elective – 1 List for 5th Semester

Sl. No	Course Code	Course Title	Credits
1	UE23CC3540	Devops Essential	3
2	UE23CC3541	Principles of Artificial Intelligence	3
3	UE23CC3542	Software Engineering	3
4	UE23CC3543	Ethical Hacking	3
5	UE23CC3544	Information Network Security	3
6	UE23CC3545	Advanced Cryptography	3

Professional Elective – 2 List for 6th Semester

Sl. No	Course Code	Course Title	Credits
1	UE23CC3640	Visualisation, Cloud Management, Cloud security	3
2	UE23CC3641	Amazon Web Services	3
3	UE23CC3642	APIs & Web Services (REST, SOAP, GraphQL)	3
4	UE23CC3643	Cloud-based Machine Learning (AWS Sagemaker / Azure ML / Vertex AI)	3
5	UE23CC3644	Blockchain & Cloud Integration	3
6	UE23CC3645	Edge & Fog Computing	3

Open Electives List

School of Computer Science & Technology (FET-SCST)				
Sl. No	**Course Title**	**Course Code**	**Semester**	**Program**
1.	Data Visualization and Analytics	UE25CS4780	7	All 9 B.Tech in Computer Science Engineering Programs
2.	Scientific Computing with Python	UE25CS4781	7	
3.	Software Engineering	UE25CS4782	7	
4.	Legal Technology and Digital evidence	UE25CS4783	7	
5.	Digital Transformation for Business leaders	UE25CS4880	8	
6.	AI and Automation for Managers	UE25CS4881	8	
7.	Cyber security for Business executives	UE25CS4882	8	
8.	Digital Twin: Concept and Application in Mechanical Systems	UE25CS4883	8	

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