

GM UNIVERSITY

PROGRAM DOCUMENT

2024 SCHEME

I - VIII SEMESTER

B.Tech
in
Computer Science
& Engineering



School of Computer Science & Technology
Faculty of Engineering & Technology



B.Tech. – Computer Science & Engineering

Program Details

Faculty	Engineering and Technology (FET)
School	School of Computer Science and Technology (SCST)
Department	Computer Science & Engineering
Program	B.Tech., Computer Science & Engineering
Director of School	Dr. Sanjay Pande M.B.
Head of Department	Dr. Shivanagowda G M

1.	Title of the Award	B.Tech. in Computer Science & Engineering
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 and Engineering The Bachelor's program in Computer Science and Engineering (B.Tech. Computer Science and Engineering) offers a comprehensive and innovative education for students aspiring to excel in the dynamic field of	

	<p>computer science, software engineering, and intelligent systems. 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 emerging technologies in the computer science industry.</p> <p>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 engineering. 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 engineering.</p> <p>Key areas of study include programming principles, algorithms, data structures, artificial intelligence, machine learning, software development methodologies, and computer networks. Students also gain proficiency in using cutting-edge programming languages, development tools, and simulation software, preparing them for the challenges of the contemporary computer science and engineering industry.</p> <p>The B.Tech. Computer Science and Engineering program aim to equip graduates for diverse career opportunities across various sectors, including software development, information technology, artificial intelligence, and smart technologies. Potential career paths encompass roles in technology companies, software industries, research and development, and entrepreneurship within the computer science domain.</p> <p>The interdisciplinary nature of computer science and engineering opens avenues to explore diverse applications, enabling graduates to contribute to advancements in technology, software solutions, and the development of intelligent 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. 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 engineering innovation.</p>
15.	<p>Program Educational Objectives (PEOs) for Computer Science and Engineering</p> <p>PEO-1: Knowledge and Technical Skills</p> <p>The program aims to provide graduates with a strong foundation in computer science and engineering principles, including algorithms, data structures, artificial intelligence, and machine learning. Upon completion, graduates will possess the knowledge and technical skills necessary to analyze, design, implement, and optimize software systems and intelligent solutions. They will be well-equipped to address real-world challenges in diverse sectors, including software development, information technology, and emerging technologies.</p> <p>PEO-2: Professional Competence and Leadership</p>

	<p>To install technical competencies, practical skills, and leadership abilities in graduates, preparing them for success in the field of computer science and engineering. Graduates will excel in roles within technology companies, software industries, research and development, and entrepreneurial ventures within the computer science domain. They will be capable of assuming both technical and leadership positions, contributing to advancements in technology and innovation.</p> <p>PEO-3: Holistic Development and Adaptability</p> <p>The program aims to nurture critical thinking, creativity, innovation, collaboration, effective communication, information literacy, flexibility, adaptability, leadership, responsibility, and social and cross-cultural interaction skills. Graduates will demonstrate the ability to adapt to evolving professional environments, ensuring they contribute effectively to their respective fields. The interdisciplinary nature of computer science and engineering prepares graduates for diverse career trajectories, fostering holistic development and lifelong learning.</p> <p>The overarching goal of the B.Tech. in Computer Science and Engineering is to produce graduates who are well-prepared to meet the challenges of the dynamic computer science industry, contribute to technological advancements, and make a positive impact on society</p>
16.	<p>Program Outcomes (POs) (Graduate Attributes)</p> <p>PO-1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.</p> <p>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.</p> <p>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 public health and safety, and the cultural, societal, and environmental considerations.</p> <p>PO-4: 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.</p> <p>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.</p>

	<p>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.</p> <p>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.</p> <p>PO-8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</p> <p>PO-9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</p> <p>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.</p> <p>PO-11: 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.</p> <p>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.</p>
17.	<p>Program Specific Outcomes (PSOs):</p> <p>Upon successful completion of the Bachelor's program in Computer Science and Engineering, graduates will possess the capability to:</p> <p>PSO-1: Analyze and Address Computational Challenges</p> <p>Graduates will demonstrate the ability to analyze complex computational requirements, identify challenges, and articulate problems with necessary specifications. Leveraging their understanding of computer science principles, graduates will deliver innovative solutions, addressing issues in areas such as software development, algorithm design, and computational applications.</p> <p>PSO-2: Apply Computer Science Concepts in System Development</p> <p>Graduates will be equipped to envision, model, design, implement, and test software systems and computational solutions. They will demonstrate proficiency in addressing technical challenges within the field of computer science and engineering, utilizing their knowledge of algorithms, data structures, and software development methodologies to create efficient, reliable, and innovative applications.</p>

PSO-3: Conduct and Lead Experimental Validation in Computer Science and Engineering After completing the program, graduates will showcase the capability to strategize, coordinate, and execute experiments for the validation and verification of software systems and computational solutions. They will adeptly use laboratory techniques and software tools for designing and simulating computational processes, and will be prepared to assume leadership roles in research projects, effectively managing teams and resources in the context of computer science and engineering.

These Program Specific Objectives 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 field. The objectives emphasize the application of CS principles in addressing real- world challenges and the development of innovative solutions in the realm of CSE.

Programme Structure

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

Courses and Credits:

Semester-1			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS1101	Foundational Mathematics for Computer Science	3
2.	UE24CS1102	Analog & Digital Fundamentals	3
3.	UE24CS1103	Advanced Materials Integration in Computing Technology	3
4.	UE24CS1104	Problem Solving through C Programming	3
5.	UE24CS1105	Web Designing & Programming	3
6.	UE24CS1106	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			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS1205	Applied Mathematics for Computer Science	3
2.	UE24CS1202	Applied Physics for CSE	3
3.	UE24CS1203	Data Structures & Algorithms	3
4.	UE24CS1204	Python Programming	3
5.	UE24CS1205	Fundamentals of Computer Networks	3
6.	UE24CS1206	Fundamentals of DBMS	3
7.	UE24CS1207	Project Based Learning / mini project on Computer Networks	2
8.	SDTCD	Technical Competency	02
9.	CASP	Life Skills	01
10.	CIBI	Innovation and Entrepreneurial Skills	00
11.	SA	Environmental Awareness and Community Services	01
12.	SA	Athletics, Sports, Yoga, Gymnasium	00
13.	SA	Cultural & Literary Activities	00
14.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
15.	CASP	Placement Training	00
Total			24

Semester-3			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS2301	Algorithm Design and Complexity Analysis	3
2.	UE24CS2302	Internet of Things	3
3.	UE24CS2303	Object Oriented Programming	3
4.	UE24CS2304	Computer Organization and Architecture	3
5.	UE24CS2305	Operating System Concepts	3
6.	UE24CS2306	Project Based Learning / mini project on Internet of Things	2
7.	SDTCD	Technical Competency	02
8.	CASP	Life Skills	01
9.	CIBI	Innovation and Entrepreneurial Skills	00
10.	SA	Environmental Awareness and Community Services	01
11.	SA	Athletics, Sports, Yoga, Gymnasium	01
12.	SA	Cultural & Literary Activities	00
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
14.	CASP	Placement Training	01
Total			23

Semester-4			
S. No.	Course Code	Course Title	Credits
1.	UE24CS2401	Machine Learning	3
2.	UE24CS2402	Software Development Methodologies	3
3.	UE24CS2403	Discrete Structures for Computing	3
4.	UE24CS2404	Unstructured Data and NoSQL Technologies	3
5.	UE24CS2405	Automata Theory and Compiler Design	3
6.	UE24CS2406	Project Based Learning / mini project on building a Machine Learning Model	2
7.	SDTCD	Technical Competency	02
8.	CASP	Life Skills	01
9.	CIBI	Innovation and Entrepreneurial Skills	01
10.	SA	Environmental Awareness and Community Services	01
11.	SA	Athletics, Sports, Yoga, Gymnasium	01
12.	SA	Cultural & Literary Activities	01
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
14.	CASP	Placement Training	01
Total			25

Semester-5			
S. No.	Course Code	Course Title	Credits
1.	UE24CS3501	Deep Learning	3
2.	UE24CS3502	AR/VR and Metaverse Technologies	3
3.	UE24CS3503	Cyber Security and Secure Systems	3
4.	UE24CS3504	Serverless Computing and Cloud functions	3
5.	UE24CS3505	Project Based Learning / mini project on Deep Learning or AR VR	3
6.	UE24CS35XX	Professional Elective - 1	3
7.	SDTCD	Technical Competency	02
8.	CASP	Life Skills	00
9.	CIBI	Innovation and Entrepreneurial Skills	00
10.	SA	Environmental Awareness and Community Services	00
11.	SA	Athletics, Sports, Yoga, Gymnasium	01
12.	SA	Cultural & Literary Activities	00
13.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
14.	CASP	Placement Training	01
Total			22

Semester-6			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS3601	Foundations of Generative AI	3
2.	UE24CS3602	Supply Chain management	3
3.	UE24CS3603	Block chain Technology	3
4.	UE24CS3604	Project Based Learning / mini project on Block Chain	3
5.	UE24CS36XX	Professional Elective - 2	3
6.	SDTCD	Technical Competency	02
7.	CASP	Life Skills	00
8.	CIBI	Innovation and Entrepreneurial Skills	01
9.	SA	Environmental Awareness and Community Services	00
10.	SA	Athletics, Sports, Yoga, Gymnasium	00
11.	SA	Cultural & Literary Activities	01
12.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
13.	CASP	Placement Training	00
Total			19

Semester-7			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS4701	Intellectual Property Rights	3
2.	UE24CS4702	Industry Internship	4
3.	UE24CS4703	Project - 1	6
4.	UE24CS47XX	Open Elective -1	2
5.	SDTCD	Technical Competency	00
6.	CASP	Life Skills	00
7.	CIBI	Innovation and Entrepreneurial Skills	00
8.	SA	Environmental Awareness and Community Services	00
9.	SA	Athletics, Sports, Yoga, Gymnasium	00
10.	SA	Cultural & Literary Activities	01
11.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
12.	CASP	Placement Training	00
Total			17

Semester-8			
Sl. No.	Course Code	Course Title	Credits
1.	UE24CS4801	Engineering Project Management	3
2.	UE24CS4802	Project - 2	6
3.	UE24CS48XX	Open Elective -2	2
4.	SDTCD	Technical Competency	00
5.	CASP	Life Skills	00
6.	CIBI	Innovation and Entrepreneurial Skills	01
7.	SA	Environmental Awareness and Community Services	00
8.	SA	Athletics, Sports, Yoga, Gymnasium	00
9.	SA	Cultural & Literary Activities	00
10.	SASP	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
11.	CASP	Placement Training	00
Total			13

List of Electives Offered

List of Professional Electives offered for 5th Semester

Sl. No.	Course Code	Course Title	Credits
1	UE24CS3540	Conversational Interfaces and UX	3
2	UE24CS3541	Artificial Intelligence	3
3	UE24CS3543	Ethical Hacking	3
4	UE24CS3544	Information Network Security	3
5	UE24CS3545	Cryptography & Network Security	3

List of Professional Electives offered for 6th Semester

Sl. No	Course Code	Course Title	Credits
1	UE24CS3640	Wireless Adhoc Networks	3
2	UE24CS3641	Malware Analysis	3
3	UE24CS3642	Sensor and Sensing Systems	3
4	UE24CS3643	Security threat and Vulnerability	3
5	UE24CS3644	Data wrangling using Python	3
6	UE24CS3645	Natural Language Processing	3

List of Open Electives offered for 7th Semester

Sl. No.	Course Code	Course Title	Credits
1	UE24CS4780	M& E	2
2	UE24CS4781	Biology of Engineers	2
3	UE24CS4782	Nano Technology	2

List of Open Electives offered for 8th Semester

Sl. No.	Course Code	Course Title	Credits
1	UE24CS4880	Renewable Energy Resources	2
2	UE24CS4881	Agricultural Robotics	2
3	UE24CS4882	Occupational Health & Safety	2