GALGOTIAS UNIVERSITY

GALGOTIAS UNIVERSITY NAAC GRADE A+ Accredited University

School of Computer Science and Engineering

Department of Computer Science and Engineering

Curriculum for Program:

Bachelor of Technology

in

Computer Science and Engineering

(Quantum Computing with Artificial Intelligence)

Batch: 2026-2030

Vision of the University

"To be known globally for value based education, research, innovation, outreach and sustainable practices"

Mission of the University

- Enabling teaching learning ecosystem to support research and governance to achieve academic success.
- Establish state-of-the-art facilities for impactful education and research.
- Collaborate with stakeholders to align with new age curriculum and skill development.
- Involvement in societal outreach programs to identify concerns and provide sustainable ethical solutions.
- Encourage life-long learning and team-based problem-solving through an enabling environment.

Vision of the Department

"To be recognized globally as a premier School of Computer Science and Engineering for imparting quality and value-based education within a multi-disciplinary and collaborative research-based environment."

Mission of the Department

M_1: Develop a strong foundation in fundamentals of Computer Science and engineering with responsiveness towards emerging technologies.

M_2: Establish state-of-the-art facilities and adopt education 4.0 practices to analyze, develop, test, and deploy sustainable ethical IT solutions by involving multiple stakeholders.

M_3: Foster multidisciplinary collaborative research in association with academia and industry through focused research groups, Centre of Excellence, and Industry Oriented R&D Labs.

PEOs of the Program

B. Tech. (CSE)

PEO1: Graduates of Computer Science and Engineering will be engaged with leading Global Software Services and Product development companies handling projects in cutting edge technologies.

PEO2: Graduates of Computer Science and Engineering will be able to serve in technical or managerial roles at Government firms, Corporates and contribute to the society as successful entrepreneurs through start-up.

PEO3: Graduates of Computer Science and Engineering will undertake higher education, research or academia at institutions of transnational reputation.

Program Outcomes (POs)

B. Tech. (CSE)

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze

complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

PSOs of the Program

B. Tech. CSE (QCAI)

PSO1: Apply the principles of Computer Science and Engineering along with emerging technologies such as Quantum Computing, Artificial Intelligence, Machine Learning, High-Performance Computing, Quantum Algorithms, and Industry 4.0 tools to develop intelligent and computationally efficient solutions for complex real-world problems.

PSO2: Demonstrate professional engineering and research practices through industry internships, innovation projects, and interdisciplinary research to design, simulate, and implement quantum-enabled and AI-driven applications across various domains.

List of Courses (Semester-Wise)

First Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	101	AI-driven Bioinformatics	3	0	0	0	**3**
2	102	Mathematics for Computer Science	3	0	1	0	**4**
3	103	Basics of Electrical and Digital Electronics	3	0	1	0	**4**
4	104	Fundamental of Cyber Security	3	0	0	0	**3**
5	105	Programming for Problem Solving	3	0	1	0	**4**
6	106	YOGA	1	0	0	0	**1**
7	107	Aptitude Skills	0	0	1	0	**1**
Total Credits			**20**				

Second Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	201	Basics of Intelligent Quantum Computing	3	0	0	0	**3**
2	202	Probability and Statistics	3	1	0	0	**4**
3	203	Discrete Structure	3	0	0	0	**3**
4	204	Engineering Design and Prototyping	3	0	1	0	**4**
5	205	Object-Oriented Programming	3	0	1	0	**4**
6	206	Science and Engineering for Sustainable World	0	0	2	0	**1**
7	207	Applied Aptitude Skills	1	0	0	0	**1**
Total Credits			**20**				

Third Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	301	Database Management System	3	0	1	0	**4**
2	302	Data Structures	3	0	1	0	**4**
3	303	Operating System	3	0	0	0	**3**
4	304	Computer Organization and Architecture	3	0	0	0	**3**
5	305	Python Programming	1	0	1	0	**2**
6	306	Design Thinking	1	0	0	0	**1**
7	307	Programming Skills with Computational Math	0	0	2	0	**2**
8	308	Advanced Aptitude Skills	1	0	0	0	**1**
Total Credits			**20**				

Fourth Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	401	Machine Learning	3	0	1	0	**4**
2	402	Design and Analysis of Algorithm	3	0	1	0	**4**
3	403	Data Communication and Networking	3	0	1	0	**4**
4	404	Foundations of Quantum Computing	3	0	0	0	**3**
5	405	Understanding Harmony and Ethical Human Conduct	1	0	0	0	**1**
6	406	Programming Skills with Data Structures	0	0	2	0	**2**
7	407	Aptitude Proficiency	0	0	2	0	**2**
Total Credits			**20**				

Fifth Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	501	Problem-Driven Programming	3	0	1	0	**4**
2	502	Deep Learning with Quantum Computing	3	0	1	0	**4**
3	503	Quantum Algorithms and Quantum Information	3	0	1	0	**4**
4	504	Open Elective–I	3	0	0	0	**3**
5	505	Summer Internship-I	1	0	0	0	**1**
6	506	Programming Skills with Advanced Data Structures	0	0	2	0	**2**
7	507	Soft Skills & Aptitude Readiness	0	0	2	0	**2**
Total Credits			**20**				

Sixth Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	601	Web Technology	3	0	1	0	**4**
2	602	Software Engineering	3	0	1	0	**4**
3	603	Quantum Communications and Quantum Hardware	3	0	1	0	**4**
4	604	Open Elective–II	3	0	0	0	**3**
5	605	Programming Skills with Advanced Algorithmic Design	0	0	3	0	**3**
6	606	Professional Readiness	0	0	2	0	**2**
Total Credits			**20**				

Seventh Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	701	Research Methodology & IPR	3	0	1	0	**4**
2	702	AI-Driven Quantum Simulations	3	0	1	0	**4**
3	703	Quantum Search and Optimization Techniques	3	0	1	0	**4**
4	704	Summer Internship	0	0	0	2	**2**
5	705	Capstone Project Phase–I	0	0	0	6	**6**
Total Credits			**20**				

Eighth Semester B. Tech CSE (QCAI)							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	801	Skilling / MOOC Certification	0	0	0	2	**2**
2	802	Capstone Project Phase-II	0	0	0	14	**14**
3	803	Industrial Internship	0	0	0	4	**4**
Total Credits			**20**				
Total Program Credits			**160**				

Open Electives Offered Across Galgotias University

Open Elective-I							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	504	Mechanisms Design for Automation and Robotics	3	0	0	0	3
2	504	Digital Signal Processing	3	0	0	0	3
3	504	General Principles of IPR	3	0	0	0	3
4	504	Operational Research	3	0	0	0	3
5	504	Nano Science and Nano Technology	3	0	0	0	3
6	504	Microprocessor and Microcontroller	3	0	0	0	3
7	504	Numerical Methods	3	0	0	0	3
8	504	Indian Literature	3	0	0	0	3
9	504	System Design	3	0	0	0	3
10	504	iOS App Design and Development	3	0	0	0	3
11	504	Fundamental of Drones	3	0	0	0	3

Open Elective-II							
Sl.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**S**	**C**
1	604	Accounting and Taxation	3	0	0	0	3
2	604	Civil Infrastructure	3	0	0	0	3
3	604	Quantum Computing	3	0	0	0	3
4	604	Advanced Numerical Methods	3	0	0	0	3
5	604	Digital Image Processing	3	0	0	0	3
6	604	Advanced Computer Architecture	3	0	0	0	3
7	604	Secure Software Engineering	3	0	0	0	3
8	604	Distributed Computing	3	0	0	0	3
9	604	Cyber Law and IT Act	3	0	0	0	3