

Master of Technology (M.Tech) in Computer Science & Engineering

M.Tech in Computer Science & Engineering will be offered with 3 specializations: Artificial Intelligence; Connected Systems and Intelligence; Cyber Security Engineering. The students will have to choose one of the specializations in the second semester. The admission and eligibility requirements for all the 3 specializations are the same.

Three Specializations:

Artificial Intelligence

The annual growth rate of artificial intelligence (AI) is predicted to be 33.2% between 2020 and 2027. The market growth of AI is hampered due to lack in the number of experienced and trained professionals. This programme would transform and strengthen the industries across the globe. It focuses on intelligence exhibited by the machines and is a hybrid intelligence, where AI systems and humans work together. The curriculum offers an opportunity to approach AI from a technical perspective that focuses on the understanding, analysis and development of novel AI algorithms as well as social and human perspectives. Decision making, problem solving, perception, understanding human communication (in any language, and translate among them) for the computers would be the key elements taught in this programme. This programme provides the foundation and advanced skills in the principles and technologies that underlie AI including logic, knowledge representation, probabilistic models, and machine learning. Students can pursue topics in depth, with courses available in areas such as robotics, vision, and natural language processing.

Connected Systems and Intelligence

The future era of digitally connected world envisages to be governed by smart connected devices that are aware of the context and the location, and envisions cognitive decision making through intelligent data analytics. The synergy derived out of the combination of artificial intelligence, big data analytics, the Internet of Things, and cloud and edge computing contribute significantly to realize the automated interaction of real-world physical systems. In 2025, according to the International Data Corporation, 41.6 billion connected IoT devices would generate 79.4 zettabytes of data. Future smart systems will rely on data intelligence tools and approaches to identify hidden patterns, unknown correlations, and other relevant information from massive amounts of data.

Graduates from this masters programme is expected to develop novel solutions for intelligent and resilient networked systems and contribute to the design of stable digitally connected ecosystems involving distributed systems, computer vision, ubiquitous computing, machine learning, data science, and security services. They will be experts in the field, qualified for exciting careers in industry or doctoral studies.



Three key UN sustainable development goals addressed by this master programme are: industry, innovation and infrastructure (09); sustainable cities and communities (11); and responsible production and consumption (12). Both connected systems and data intelligence play a crucial role in enabling technologies to achieve some of the above-mentioned objectives such as the development of smart cities, safe and efficient transport systems and efficient resource consumption and production.

Cyber Security Engineering

Cyber security remains one of the most growth-oriented career fields in the computer science domain. The Cyber Security Engineering degree programme focuses on the fundamentals of developing, engineering, and operating secure information systems. Graduates of this programme will be able to solve complex cyber security issues affecting various businesses worldwide and propose new solutions. Graduates are likely to be employed in law enforcement, government or other related agencies as cyber security specialists, in commercial IT departments or security consultancies, or in other computing positions where cyber security is a major issue. Opportunities also exist for further academic study towards a Ph.D and a career in research.

CURRICULUM

M. Tech in Computer Science and Engineering with Specialization in AI or Connected Systems & Intelligence or Cyber Security Engineering

Semester 1				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
	Digital Experience Laboratory	4	1-3-0-0	300
	Design Thinking and Innovation	3	3-0-0-0	300
M3010101	AI & Machine Learning	4	3-1-0-0	300
M3010102	Mathematical Foundations of Computer Science	4	3-0-1-0	300
M3010103	Advanced Data Structures and Algorithms	4	3-1-0-0	300
M3010104	Advanced Distributed Systems	4	3-1-0-0	300
	Elective 1	4		300
Total Credits		27		

1 st Semester Electives (Open for all specializations)				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
M3010105	Soft Computing	4	3-0-0-1	300
M3010115	Natural Language Processing	4	3-0-0-1	300
M3010125	Cognitive Computing	4	3-0-0-1	300
M3010135	Blockchain Technology	4	3-1-0-0	300
M3010145	Security in Digital Transformation	4	3-0-0-1	300

Semester 2				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
	Digital Access Community Empowerment	3	0-0-0-3	300
M3010201	Data & Intelligence	4	3-1-0-0	300
	Elective 2	4		300
	Elective 3	4		300
	Elective 4	4		300
	Elective 5	4		300
Total Credits		23		

2nd Semester Electives for Specialization in AI (Four electives need to be selected)				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/Seminar/Project	Level
M3010202	Deep Learning & Reinforcement Learning	4	3-0-0-1	300
M3010212	Data Mining and Big Data	4	3-0-0-1	300
M3010222	Human Computer Interaction	4	3-0-0-1	300
M3010232	Computer Vision	4	3-0-0-1	300
M3010242	AI Ethics and Sustainability	4	3-0-1-0	300
M3010252	Connected Environments and Enabling Technologies	4	1-3-0-0	300
M3010262	Social Network Analytics and Security	4	3-0-0-1	300
M3010272	Speech Processing	4	3-0-0-1	300
M3010282	Augmented and Virtual Reality	4	3-1-0-0	300
M3010292	Stochastic Processes and Models	4	3-0-0-1	300
M3010203	Image & Video Processing	4	3-0-0-1	300

2nd Semester Electives for Specialization in Connected Systems & Intelligence (Four electives need to be selected with minimum three from Group A)				
Group A				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/Seminar/Project	Level
M3010213	Cloud and Edge Computing	4	3-0-0-1	300
M3010252	Connected Environments and Enabling Technologies	4	1-3-0-0	300
M3010223	IoT Networks and Endpoint Security	4	2-2-0-0	300
M3010233	Industrial IoT and Digital Twins	4	3-0-0-1	300
M3010243	Software Defined Networking	4	3-0-0-1	300
M3010253	Internet of Drones	4	3-0-0-1	300
M3010263	Cyber Big Data Analytics	4	3-0-0-1	300
M3010262	Social Network Analytics and Security	4	3-0-0-1	300
M3010273	Ubiquitous Computing	4	3-0-0-1	300
M3010283	Biometric Systems Engineering	4	3-1-0-0	300
M3010293	Hardware Security	4	3-1-0-0	300
M3010204	Wireless Networks and Mobile Computing	4	3-0-0-1	300
M3010214	Wireless Sensor Networks	4	3-0-0-1	300
M3010224	Cryptographic Engineering	4	3-1-0-0	300
Group B				
M3010202	Deep Learning & Reinforcement Learning	4	3-0-0-1	300
M3010234	Quantum Computing & Cryptography	4	3-0-0-1	300
M3010244	Video Analytics	4	3-0-0-1	300
M3010222	Human Computer Interaction	4	3-0-0-1	300
M3010282	Augmented and Virtual Reality	4	3-1-0-0	300

2nd Semester Electives for Specialization in Cyber Security Engineering (Four electives need to be selected with minimum three from Group A)				
Group A				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
M3010254	Network and System Security	4	3-1-0-0	300
M3010293	Hardware Security	4	3-1-0-0	300
M3010264	Ethical Hacking and Network Defense	4	3-1-0-0	300
M3010223	IoT Networks and Endpoint Security	4	2-2-0-0	300
M3010274	AI Based Cyber Attacks and Defenses	4	3-0-0-1	300
M3010263	Cyber Big Data Analytics	4	3-0-0-1	300
M3010284	Malware Analysis and Reverse Engineering	4	3-1-0-0	300
M3010283	Biometric Systems Engineering	4	3-1-0-0	300
M3010294	Advanced Topics in Cryptography	4	3-0-1-0	300
M3010262	Social Network Analytics and Security	4	3-0-0-1	300
M3010205	Cyber Crime Investigation	4	3-0-0-1	300
M3010224	Cryptographic Engineering	4	3-0-0-1	300
M3010215	Secure Software Engineering	4	3-0-0-1	300
M3010234	Quantum Computing & Cryptography	4	3-0-0-1	300
Group B				
M3010222	Human Computer Interaction	4	3-0-0-1	300
M3010252	Connected Environments and Enabling Technologies	4	1-3-0-0	300
M3010213	Cloud and Edge Computing	4	3-0-0-1	300
M3010202	Deep Learning & Reinforcement Learning	4	3-0-0-1	300
M3010282	Augmented and Virtual Reality	4	3-1-0-0	300
M3010233	Industrial IoT and Digital Twins	4	3-0-0-1	300
M3010244	Video Analytics	4	3-0-0-1	300

Semester 2 (Internship)				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
M3010225	M. Tech Summer Internship/Team Project	6	0-0-0-6	300
Total Credits		6		

Semester 3				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
M4010301/ M4010302/ M4010303	Topics in AI/in Connected Systems & Intelligence/ Cyber Security	20	Research (20)	400
Total Credits		20		

Semester 4				
Course Code	Course Title	Credits	Credit Split Lecture/Lab/ Seminar/Project	Level
M4010401	M. Tech Thesis	30	0-0-6-24	400
Total Credits		30		

Audit Courses (non-credit courses) - NPTEL Courses		
Computer Networks and Internet Protocol	Sensors and Actuators	Speaking Effectively
Cryptography and Network Security	Python for Data Science	Graph Theory
Stochastic Modeling and the Theory of Queues	Operating System	The Joy of Computing using Python
Big Data Computing/Algorithms for Big Data	Data Mining	Innovation, Business Models and Entrepreneurship