

M.Tech. for Working Professionals

January 2023



**Indian Institute of
Information Technology
Kottayam**



Overview

In the year 2019, the Indian Institute of Information Technology Kottayam launched the M.Tech. programme for working professionals. M.Tech. for Working Professionals is a **self-paced** programme of 60 credits that can be taken over 3-5 years. Students will do 32 credits of coursework in the first two years. In the third year, they would be working on a project in two phases with 14 credits in each phase. The students can take a lesser number of courses in different semesters and complete the coursework requirement in 2-4 years. The projects can be taken only after the coursework requirement is complete. The number of credits done by the candidates in this M.Tech. programme is equivalent to the number of credits done by the students of the full-time M.Tech. programme.

Significance

Demand for engineers is rising with each passing year and with the fierce competition in this field, engineers with the required skills for a particular job type have become one of the most important criteria for selection. Good Engineers are vital for the formation of a skilled and educated workforce for any country. They are responsible for the improvement and development of the existing technology as well as the introduction of new technology to ease as many human efforts as possible. Enrolling in an M.Tech. programme after completing a Bachelor's degree allows you to explore both managerial as well as professional engineering roles. Indian Institute of Information Technology Kottayam provides an opportunity to pursue M.Tech., for working professionals to help them elevate their position in an organisation. A Master's degree allows you to specialize in your interested technical field along with giving you an edge over your colleagues.

Programme Highlights

- IITK offers four programmes in M.Tech. for Working Professionals -
 - M.Tech. in Artificial Intelligence and Data Science
 - M.Tech. in Cyber Security
 - M.Tech. in Computer Science and Engineering with specialization in Big Data and Machine Learning
- Proficient faculty members with Research & Industry experience.
- Benefit from Case Studies, Simulations, Virtual Labs & Remote Labs that allow learners to apply concepts to simulated and real-world situations.

- Encourage and prepare engineers to present journal or conference publications during the duration of the programme.
- The thesis (Project Work) in the final two semesters enables students to apply concepts and techniques learned during the programme.
- **Course break** is possible for those who go for an onsite job.
- The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals.
- This programme can be extended to an integrated Ph.D. programme.

Why IIT Kottayam?

- **Entrepreneurial Ecosystem**

IIT Kottayam is designed to impart an entrepreneurial ecosystem on the campus. For instance, AIC-IIT Kottayam, an incubation centre of IIT Kottayam, is a vital resource to IIT Kottayam students; AIC-IIT Kottayam is a 10000 sq. feet incubation unit supported by AIM-NITI Aayog of India to the tune of Rs. 3.46 crores. It has attracted connections with leading industries, including RELIANCE JioGenNext (Entrepreneurial Unit), to motivate our student start-ups and promote student/faculty exchange. In addition, it has established an Entrepreneurial Innovation Club jointly with Wadhvani Foundation, an MNC from Silicon Valley, USA. IIT Kottayam, thus, helps students to continue championing their careers and attain goals with entrepreneurial support. It provides tens of thousands of opportunities for them to develop their business ideas or thesis to products through MSME schemes – For each successful business idea, our MSME Business Incubation unit could offer Rs.15 lakhs for students.

- **Memorandum of Understanding with top universities/industries**

IIT Kottayam has already established MoU with some leading industrial/academic institutions to ensure placements or organize knowledge transfer programmes. MoUs with the Government of India, and the Government of Kerala, have manifested the organization of the knowledge transfer programme. Indian Institute of Information Technology Kottayam and the University of Glasgow, United Kingdom are jointly working on a collaborative project titled “Internet of Things (IoT) for Intelligent Systems”, funded by the British Council through its Going Global India Exploratory Grant. An MOU is made between the Indian Institute of Information Technology Kottayam (IIITK) and the Taiwan-India Joint Research Center on Artificial Intelligence (“CCU AI Center”), a research center supported by the Ministry of Science and Technology, Taiwan with the scope of collaboration on research activities include joint research projects on Artificial Intelligence and related technologies, online classes, student exchanges, faculty development programs, co-

supervision of Master Thesis and Ph.D. dissertations. In addition, IIIT Kottayam has signed an MOU with Berlin-based Edu Tech company, the German Academy of Digital Education (DADB). As part of this MOU, a digital learning centre has been established at the IIITK campus, which aims to facilitate AR/VR immersive blended learning programmes for training for graduate engineers, academicians, and working professionals on 5G and advanced wireless communication skills. IIIT Kottayam is one of the few institutes from India which is working along with Microsoft for the benefit of the common man in the domains of Agriculture, and climate change and to make the world a better place to live in. The institute has also signed an MoU with the University of New Brunswick (UNB) Canada. IIIT Kottayam and UNB shall promote collaboration through a broad range of strategies such as Staff exchange, student exchange and study abroad programs at the undergraduate level, postgraduate level and summer schools, and joint programmes at both undergraduate and postgraduate. Aimed at associating with the Kerala Police in various cyber- and information technology-based projects, the Indian Institute of Information Technology (IIIT), Kottayam, has joined hands with the Kerala Police Cyberdome. IIITK has active Industry Tie-ups with IBM, TCS, UST Global, and NeST Digital. Other Active Collaborations include National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore, Manorama Horizon for Online Certification Programs, etc.

- **Faculty Strength**

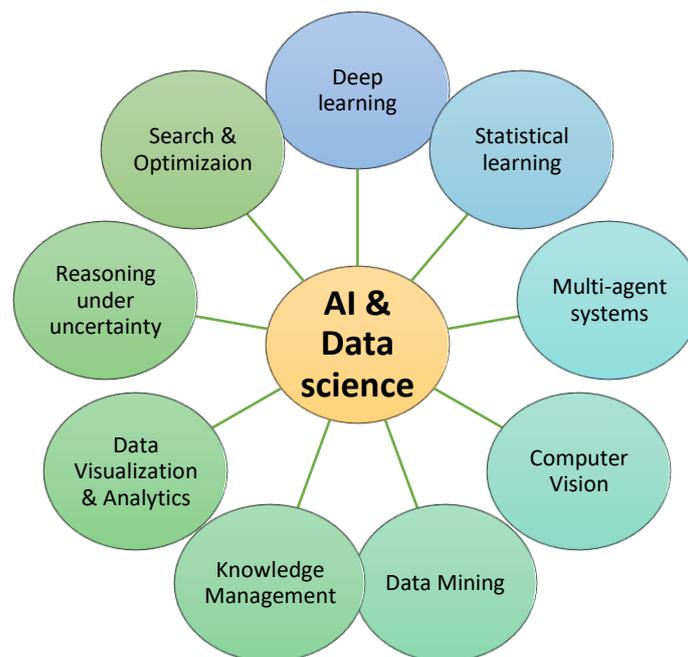
IIIT Kottayam is composed of world-class, qualified faculty members who are eager to continue research and contribute to the Indian/International society along with their wards. They design the courses per the partnered industries' needs and international requirements.

They are passionate enough to mentor/guide students apart from their working hours while ensuring the technological growth of individuals.

Programmes

- **Artificial Intelligence and Data Science**

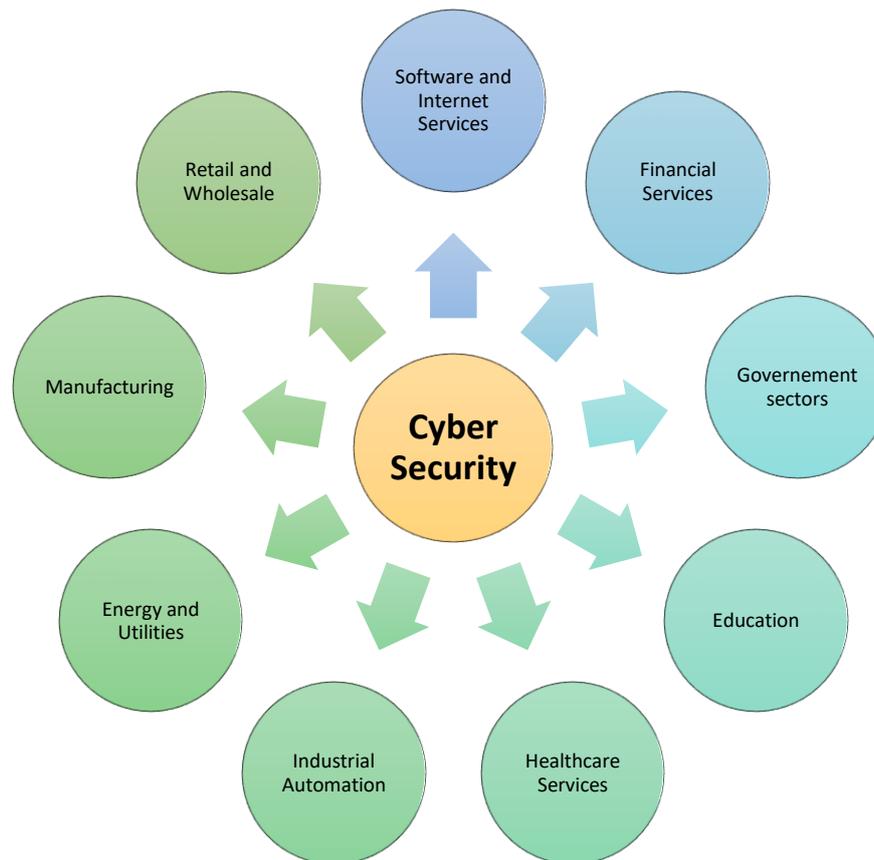
A data-centred culture is imperative for the digital transformation of enterprises around the world, especially in the post-pandemic era. Aggressive deployment of Artificial Intelligence (AI) on data can impact the strategic core of businesses and can empower organizations to gain a competitive edge.



The M.Tech. program in AI & Data Science offered by the Indian Institute of Technology Kottayam aims to demystify the technologies of AI, providing a holistic view of machine learning and analytics. Contrary to conventional beliefs, the sheer academic knowledge of learning algorithms is inadequate to design AI systems. The AI & Data Science program thus broadens the horizon to impart knowledge on the tools, industry-relevant skills, and implications of AI enabling professionals to seamlessly chart Data Science career paths. With a focus on unravelling the intricacies of the programming tools for data science, the program is curated to deliver a cogent blend of technological proficiency and business innovation.

- **Cyber Security**

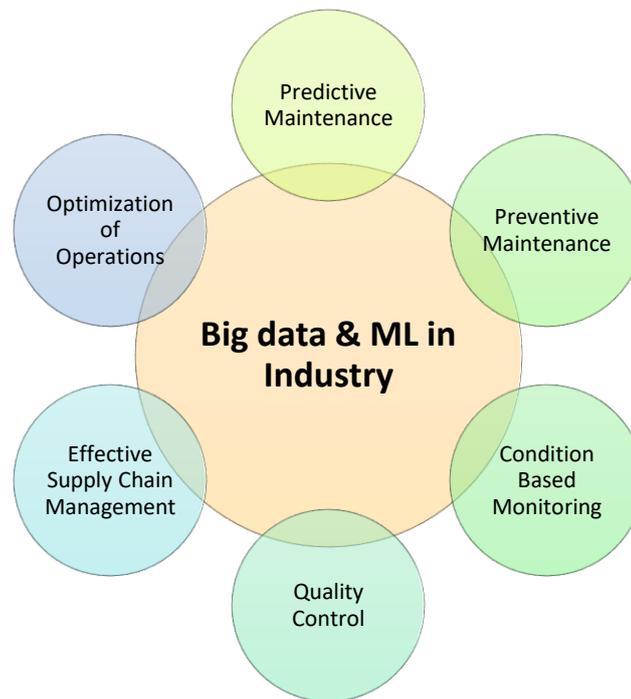
Cyber Security is necessary as it protects from data breaches, threats, attacks, and damages in various Industries. Cyber security offers cutting-edge security solutions and services across a wide range of sectors such as Software and Internet Services, financial services, Government sectors, Education, Healthcare, Industrial Automation, Energy and Utilities, Manufacturing, Retail and Wholesale sectors.



Cybersecurity is crucial to the success of the global digital economy. Customers should have complete trust in the security of data, systems, products, or the services offered by the industry only then they will actively support Digital Transformation. Therefore, industries face a huge demand for specialists and trained cybersecurity professionals with technical expertise to defend mission-critical computer systems, networks, and applications against cyberattacks. Cybersecurity as a career requires thinking quickly and strategically to ward off data breaches and network takeovers. The M.Tech. program in Cyber security aims to have defensive and offensive techniques with a good balance between theoretical, practical, and industrial aspects.

- **CSE with Specialization in Big Data and Machine Learning**

Machine learning is artificial intelligence (AI) method of discovering knowledge to make intelligent decisions. In the manufacturing industries, Machine Learning and Big Data analysis techniques are applied to analyze large data sets for developing approximations regarding the future behaviour of the systems, detect anomalies and identify best and worst-case scenarios for all possible situations. With the help of a huge data pool, manufacturing companies can have the capability to conduct sophisticated statistical analyses using big data analytics. Here, the machine learning algorithms would be utilized to determine new business models, fine-tune product quality, optimize operations, uncover important insights and make smarter business decisions.



Big Data has already greatly impacted scientific discoveries and value creation. Big data analytics and machine learning algorithms could help manufacturing companies assess the state of the supply chain and drive efficiencies with inventory optimization, demand planning, supply planning, operations planning, logistics, etc. Big Data allows predictive modelling to support decision-making that has been utilized for ingesting and integrating large amounts of data from geospatial data, graphical data, text, and temporal data. Machine learning also eliminates routine operations with minimum supervision/intervention from humans. Therefore, smart businesses are shifting their approaches to big data analytics.

Across industries, companies are reshaping their infrastructures to maximize intelligent automation, integrating their data with smart technologies to improve not only productivity but also their ability to better cater to their customers. Big data is transforming businesses and driving growth throughout the global economy. Big data is a fast-growing field with exciting opportunities for professionals in all industries and across the globe. The importance of big data and data analytics is going to be growing continually in the forthcoming years and it is one of the most rewarding careers with a number of opportunities in the field.

Duration	Self-paced over Three to Five years
Intake	Maximum 60
Eligibility	<ol style="list-style-type: none"> 1. The candidate must be employed in Industry/R&D/Academics at the time of applying. Only the employment acquired after the award of the qualifying degree will be considered. 2. The candidate must have a B.Tech./BE/AMIE degree in any discipline or MCA or MSc/MS degree in CS/IT/Mathematics/ Physics/Statistics. The candidate should have scored at least 60% aggregate in the degree examination.
Selection Procedure	<ol style="list-style-type: none"> 1. Candidates must fill out an online application. 2. Shortlisted candidates will have to take a written test and/or interview. 3. Prior research exposure and/or industry experience in areas related to Artificial Intelligence/Data Science/Cyber Security will be considered a desirable aspect. 4. The final selection of the candidate will be based on the performance in the written test, the interview, and any other criteria deemed suitable by the admission committee. 5. The department reserves the right to set any cut-off criteria for shortlisting the candidates.
Documents required while submitting the online application	<ol style="list-style-type: none"> 1. Proof of Employment from the place of work (industry). 2. Scanned copy of Qualifying degree, Mark lists, and Certificates from Class X onwards.
Application Fee	<ul style="list-style-type: none"> • The fee for online application is ₹500/- (Except for women/SC/ST Candidate). • All Women candidates and Scheduled Castes (SC)/Scheduled Tribes (ST) candidates are required to pay ₹250/- towards the Application Fee.

Fee structure

1. For the successful completion of the programme, the students have to complete 32 Course credits and 28 Project credits.
2. The course fee is ₹12,000 per credit for the theory/lab courses and Rs 5,000/- per credit for the project work.
3. The following are typical tuition fee figures to be paid by the students per semester for (1) AI & Data Science, and (2) Cyber Security.

Semester	Credits	Fees
I	8	96,000/-
II	8	96,000/-
III	9	1,08,000/-
IV	7	84,000/-
V	14	70,000/-
VI	14	70,000/-
Total	60	5,24,000/-

4. The following are typical tuition fee figures to be paid by the students per semester for CSE with specialization in Big Data and Machine Learning.

Semester	Credits	Fees
I	9	1,08,000/-
II	7	84,000/-
III	10	1,20,000/-
IV	6	72,000/-
V	14	70,000/-
VI	14	70,000/-
Total	60	5,24,000/-

5. Once selected, if for any reason the student is not willing to register or take a break for a particular semester a registration fee of ₹10,000 per semester is to be paid to keep the enrolment active.

Important Dates

Release of online application form	November 1, 2022
Last date for submitting online applications	November 30, 2022
Announcement of Selection List for written test and/or interview	December 8, 2022
Date of written test and /or interviews	December 9-18, 2022
Announcement of selected candidates	December 21, 2022
Last date for fee payment	January 2, 2023
Last date for online verification	January 3, 2023
Registration	January 5, 2023
Commencement of classes	January 6, 2023

Course Mode

- The classes, virtual lab sessions, and mid-semester exams shall be conducted in online mode.
- End Semester Exam, as well as Final Project Review, shall be conducted in Offline mode. The offline exam centres will be the Off-Campus centre in Trivandrum or Exam centres in Bangalore, Pune, Hyderabad, and Allahabad/Delhi, subject to the availability of sufficient candidates.
- The time slot in which a course would be taught would be informed to students beforehand to help them in deciding on electives.
- Live recording, submission, and internal assessment will be under the in-house developed platform.

To know more about us

Please visit us @

<http://mtech.iiitkottayam.ac.in/>

General Course Structure

M.Tech. in AI and Data Science

Course Code	Course	L-T-P	Credits
Semester I			
DSC511	Statistical Foundations for Data Science	2-0-0	2
DSC512	Programming and Data Structures	2-0-2	3
DSC513	Introduction to Data Science	2-0-2	3
Semester II			
DSC521	Mathematical Foundations for Data Science	2-0-0	2
DSC522	Artificial Intelligence Engineering	2-0-2	3
DSC523	Data Mining	3-0-0	3
Semester III			
DSC611	Machine Learning: Principles and Practices	3-0-0	3
DSC612	Elective I	3-0-0	3
DSC613	Elective II	2-0-2	3
Semester IV			
DSC621	Elective III	3-0-2	4
DSC622	Elective IV	2-0-0	2
DSC623	Business Analytics	1-0-0	1
Semester V			
CSE711	Project (Phase 1)		14
Semester VI			
CSE721	Project (Phase 2)		14
Total Credits			60

Electives:

- Real time-Analytics (2-0-2)
- Natural Language Processing (2-0-2)
- Big Data Analytics (2-0-2)
- Graphs Algorithms and Mining (2-0-0)
- Information Retrieval (2-0-0)
- Ethics for Data Science (1-0-0)
- Neural Networks and Deep Learning (3-0-0)
- Advanced Topics in Data Processing (3-0-2)
- Data Visualization and Predictive Analytics (3-0-2)

M.Tech. in Cyber Security

Course Code	Course	L-T-P	Credits
Semester I			
CBM511	Mathematical Foundations for Cyber Security I	2-0-0	2
DSC512	Programming and Data Structures	2-0-2	3
CBM513	Computer Networks and Security	2-0-2	3
Semester II			
CBM521	Secure Software Engineering	2-0-0	2
CBM522	Information Security and Applied Cryptography	2-0-2	3
CBM523 /CBM524	Decision Support and Artificial Intelligence / AI, Machine Learning and Security	2-0-2	3
Semester III			
CBM611	Operating System Security	2-0-2	3
CBM612	Elective I	2-0-2	3
CBM613	Elective II	2-0-2	3
Semester IV			
CBM621	Elective III	3-0-2	4
CBM622	Elective IV	2-0-0	2
CBM623	Criminal Psychology and Behaviour Intelligence	1-0-0	1
Semester V			
CBE711	Project (Stage 1)		14
Semester VI			
CBE721	Project (Stage 2)		14
Total Credits			60

Electives:

- Distributed System Security (2-0-2)
- Cloud Computing and Security (2-0-2)
- Advanced Database Security (2-0-2)
- Secure Hardware Design (2-0-2)
- Blockchain Architecture and Applications (2-0-2)
- Network, Wireless, IoT, Mobile & Security (2-0-2)
- Forensics, Malware, and Penetration Testing (3-0-2)
- Intrusion Detection Systems and Firewall (3-0-2)
- Digital Forensics (2-0-0)
- Legal Aspects of Computing (2-0-0)
- Information Security Policies, Security Standards, Audits, Cyber Ethics, Privacy and Legal Issues (2-0-0)

M.Tech. Computer Science and Engineering with Specialization in Big Data & Machine Learning

Course Code	Course	L-T-P	Credits
Semester I			
DSC511	Statistical Foundations for Data Science	2-0-0	2
DSC512	Programming and Data Structures	2-0-2	3
DSC513	Introduction to Data Science	2-0-2	3
BML511	SQL, Next Generation Databases, and Big Data	1-0-0	1
Semester II			
DSC521	Mathematical Foundations for Data Science	2-0-0	2
DSC523	Data Mining	3-0-0	3
BML521	Distributed Systems for Big Data Management and Processing	1-0-0	1
BML522	Big Data Visualization	1-0-0	1
Semester III			
DSC611	Elective I	3-0-0	3
DSC612	Elective II	3-0-0	3
DSC613	Big Data Analytics	2-0-2	3
BML611	Elective III	1-0-0	1
Semester IV			
BML621	Elective IV	1-0-2	2
BML622	Elective V	2-0-0	2
BML623	AI and ML for Big Data	1-0-0	1
BML624	Elective VI	1-0-0	1
Semester V			
CSE711	Project (Stage I)		14
Semester VI			
CSE721	Project (Stage II)		14
Total Credits			60

Electives:

- Elective 1 (3 Credits)
 1. Natural Language Processing
 2. Video and Image Mining
 3. Social Network Mining
 4. Graph Mining
 5. Reinforcement Learning

6. Speech Processing

7. Machine Vision

- Elective 2 (2 Credits)
 1. Intelligent Information retrieval in Big Data
 2. Dev Ops
 3. Predictive Analytics
 4. Explainable AI
 5. Data Warehousing & OLAP
 6. Exploratory Data Analysis
 7. Optimizations for Machine Learning
 8. Complex Networks and Web

- Elective 3 (1 Credit)
 1. HPC Applications
 2. Data Governance in Big Data
 3. Business Intelligence for Big Data
 4. ML applications in Cyber Security
 5. Fundamentals of Artificial Intelligence

Frequently Asked Questions

1. Who conducts the classes?

All classes are conducted by the IIIT Kottayam faculty. Industry experts are also invited for sharing their valuable experiences.

2. What is the Teaching Methodology?

The pedagogy is highly interactive and incorporates expansive teaching methods and approaches.

3. What PG Degree do we get?

On successful completion of the course, the candidates will be awarded **M.Tech. Degree in Artificial Intelligence and Data Science/M.Tech. Degree in Cyber Security/ M.Tech. in Computer Science and Engineering with specialization in Big Data and Machine Learning.**

4. Can I visit the campus and have face-to-face interaction with the faculty members?

Participants are welcome to visit the campus and meet the faculty members, with prior appointments.

5. What is the duration of the course?

Six Semesters, which should be completed within a duration of a minimum of three to a maximum of five years.

6. What do the minimum and maximum durations refer to?

Minimum duration is the minimum period required to get your degree. Maximum duration indicates that you have to finish your degree within that period failing which your academic programme will be terminated unless Senate approves any extension.

7. As a part-time student, can I get any form of assistantship?

No, you are not eligible for an assistantship from Institute sources.

8. What is the fee structure?

The course fee is ₹12,000 per credit for the theory/lab courses and Rs 5,000/- per credit for the project work. The students are required to earn a minimum of 60 credits for the award of the M.Tech. Degree. Thus, the course fees come to a total of **5,24,000/-**.

9. What is the eligibility for applying to MTech in (1) AI & Data Science, (2) Cyber Security, and (3) CSE with specialization in Big Data and Machine Learning?

The candidate must be employed and must have a B.Tech./B.E./AMIE degree or MCA or M.Sc./MS degree in CS/IT/Mathematics/Physics/Statistics.

10. I still have questions regarding admissions/PG degree programmes at IIIT Kottayam, whom shall I contact?

Please drop an email to pgacademics@iiitkottayam.ac.in / registrar@iiitkottayam.ac.in.

For further details please contact us

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Valavoor, Pala, Kottayam – 686635, Kerala

Ph: 0482-220 2161 / 2137 / 2100 / 2174

Email: pgacademics@iiitkottayam.ac.in, registrar@iiitkottayam.ac.in