M.Tech.

IN

Computer Science and Engineering
(Artificial Intelligence & Data Analytics)

CURRICULUM

Department of Computer Science and Engineering

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Kozhikode - 673601, KERALA, INDIA

The Program Educational Objectives (PEOs) of M.Tech. in Computer Science and Engineering (Artificial Intelligence & Data Analytics)

PEO1	The graduates shall have an in-depth knowledge in the fundamentals of Artificial Intelligence and Data Analytics with the ability and confidence to specialize in specific areas of individual interest.
PEO2	The graduates shall have the ability to solve problems and critically analyze solutions in the area of interest in AI and Data Analytics.
PEO3	The graduates shall have the skill set for using knowledge in AI and Data Analytics, for the benefit of society with sound ethical practices and a lifelong interest in contributing to knowledge in the field

Programme Outcomes (POs) & Programme Specific Outcomes (PSOs) of M.Tech. in Computer Science and Engineering (Artificial Intelligence & Data Analytics)

PO1	An ability to independently carry out research / investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to identify appropriate mathematical, analytical or software tools and use them to solve problems in the area of AI and Data Analytics, by applying appropriate skill sets acquired in the area.
PSO 1	Students should have the ability to critically analyze solutions, proofs and programs in the field of AI and Data Analytics.
PSO 2	Students should have the ability to communicate ideas, based on ethical values, and remain aware of the social responsibilities in the profession.

CURRICULUM

Total credits for completing M.Tech. in Computer Science and Engineering (Artificial Intelligence & Data Analytics) is 75.

COURSE CATEGORIES AND CREDIT REQUIREMENTS:

The structure of M.Tech. programme shall have the following Course Categories:

Sl. No.	Course Category	Minimum Credits
1.	Programme Core (PC)	20
2.	Programme Electives (PE)	18
3.	Institute Elective (IE)	2
4.	Projects	35

The effort to be put in by the student is indicated in the tables below as follows:
L: Lecture (One unit is of 50 minute duration)
T: Tutorial (One unit is of 50 minute duration)
P: Practical (One unit is of one hour duration)
O: Outside the class effort / self-study (One unit is of one hour duration)

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1	CS6301E	Introduction to Data Analytics	3	0	2	7	4	PC
2	CS6302E	Theoretical Foundations of Machine Learning	3	1	0	8	4	PC
3	CS6303E	Topics in Artificial Intelligence	3	0	2	7	4	PC
4		Programme Elective 1*	3	0	0	6	3	PE
5		Programme Elective 2	3	0	0	6	3	PE
6		Institute Elective	2	0	0	4	2	IE
		Total					**20**	**--**

* Programme Elective 1 is to be taken from the AIDA Soft-Core basket

Semester II

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS6304E	Machine Learning	3	1	0	8	4	PC
2.	CS6393E	Advanced Machine Learning Laboratory	1	0	6	5	4	PC
3.		Programme Elective 3	3	0	0	6	3	PE
4.		Programme Elective 4	3	0	0	6	3	PE
5.		Programme Elective 5	3	0	0	6	3	PE
6		Programme Elective 6	3	0	0	6	3	PE
7	CS6396E	Project Phase I	0	0	4	2	2	PC
		Total					**22**	**--**

Semester III

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7397E	Project Phase II	0	0	6	3	3	PC
2.	CS7398E	Project Phase III	0	0	30	15	15	PC
		Total					**18**	**--**

Semester IV

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7399E	Project Phase IV	0	0	30	15	15	PC
		Total					**15**	**--**

List of Programme Electives*

(Common for all the M.Tech Programmes of the Department of CSE: CS61, CS62 and CS63)

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1	CS6104E	Advanced Operating System Design	3	0	0	6	3
2	CS6105E	Algorithms for Big Data	3	0	0	6	3
3	CS6106E	Bioinformatics	3	0	0	6	3
4	CS6107E	Topics in Compiler Design	3	0	0	6	3
5	CS6108E	Computer Networking	3	0	0	6	3
6	CS6109E	Topics in Image Processing	3	0	0	6	3
7	CS6110E	Pattern Recognition	3	0	0	6	3
8	CS6211E	Topics in Computational Geometry	3	0	0	6	3
9	CS6112E	Topics in Computer Architecture	3	0	0	6	3
10	CS6113E	Topics in Database Design	3	0	0	6	3
11	CS6114E	Topics in Network Systems	3	0	0	6	3
12	CS6115E	Topics in Parameterized Algorithms	3	0	0	6	3
13	CS6116E	Topics in Programming Languages	3	0	0	6	3
14	CS6117E	Topics in Quantum Computing	3	0	0	6	3
15	CS6202E	Computer Architecture and Design	3	0	0	6	3
16	CS6203E	Topics in Cryptography	3	0	0	6	3
17	CS6204E	Topics in Data Privacy	3	0	0	6	3
18	CS6205E	Topics in Information Security	3	0	0	6	3
19	CS6206E	Systems Security					
20	CS6320E	Statistical Foundations of Data Science	3	0	0	6	3
21	CS6305E	Advanced Data Structures and Algorithms	3	0	0	6	3
22	CS6306E	Advanced Deep Learning and Computer Vision	3	0	0	6	3
23	CS6307E	AI in Healthcare	3	0	0	6	3
24	CS6308E	Topics in Approximation Algorithms	3	0	0	6	3
25	CS6309E	Computational Linear Algebra	3	0	0	6	3
26	CS6310E	Computational Optimization Methods	3	0	0	6	3
27	CS6311E	Topics in Data Mining	3	0	0	6	3
28	CS6312E	Distributed Computing and Big Data	3	0	0	6	3

29	CS6313E	High Performance Computing for AI	3	0	0	6	3
30	CS6314E	Intelligent Agents	3	0	0	6	3
31	CS6315E	Internet of Things	3	0	0	6	3
32	CS6316E	Music Information Retrieval	3	0	0	6	3
33	CS6317E	Topics in Natural Language Processing	3	0	0	6	3
34	CS6318E	Neural Networks and Deep Learning	3	0	0	6	3
35	CS6319E	Speech Information Processing	3	0	0	6	3

*Students may also choose any core/elective course of appropriate level offered in the Institute as Programme Electives, with approval from the Programme Coordinator.

Notes:

- The student has to earn a minimum of 75 credits to become eligible for the M.Tech degree.
- Those aiming for industry internships may complete their course requirements in the first two semesters itself.
- The student has to earn 38 credits to become eligible for P. G Diploma. It may be done in the first two semesters with an optional Project Phase II in the department itself.
- For the Programme Elective 1 in the first Semester, the student should credit one of the Programme Electives coming under the ‘AIDA Soft-Core Basket’ (tagged with an asterisk). In the current curriculum, the electives CS6318E Neural Networks and Deep Learning, CS6317E Topics in Natural Language Processing, and CS6311E Topics in Data Mining are tagged as “AIDA Soft-Core”. The department may choose to tag newly proposed electives as “AIDA Soft-Core”, based on their content.