International Institute of Information Technology Bangalore

Curriculum Document

M.Tech.

Artificial Intelligence & Data Science (AI & DS)

(Effective from academic year 2025-26)

March 2025

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1 Overall M.Tech AI & DS Programme Structure

The following Table provides a summary of the credit distribution in the M.Tech AI & DS programme.

Table 1: Overview of the curriculum

Term	Duration	Credits	Courses
Preparatory Term	2 weeks	Not applicable	Orientation sessions on various topics
Semester 1	16 weeks	16 credits	Foundation Courses
Semester 2	16 weeks	16 credits	Electives
		0 credits	Technical Communication for those found deficient in a test conducted in Semester 1 (Pass /Fail)
Semester 3	16 weeks	16 credits	Electives
Semester 4	26 weeks	16 credits	Masters Project / Internship/ Thesis
	Total		**64 credits**

2 Areas of specialization

The M.Tech. (AI&DS) curriculum does not allow specializations as the degree is a specialized one. Students can take courses in different areas that includes Data and Systems (DAS), AI Theory (AIT), AID (AI in Data Domains) and AIX (AI in Application Domains).

3 Preparatory courses

Students entering the M.Tech. programme are expected to come with some prior knowledge of programming. While we do not wish to conduct full-fledged programming courses at the Masters level, we will provide an opportunity for the students to hone up their programming skills in a structured way as part of the preparatory term. In the preparatory term, M. Tech (DSAI) students will cover topics in programming (Python, C and Java) and some basic Data Structures.

4 Foundation Courses

M.Tech (AI&DS) students in the first semester do the following 4 courses, earning 16 credits Each course here is of 4 credits.

1. Algorithms
2. Deep Neural Networks
3. Machine Learning
4. Mathematics for Machine Learning

5 Electives

The number of electives to be completed by each student is **eight**. Thus the total number of credits that can be accumulated through electives is now 32 credits. Each elective will be associated with one or more areas of specialization.

MTech AI&DS students are mandated to do 3 branch electives, 3 free electives and 1 open elective. They do a mandatory HSS elective covering AI and Ethics OR Data and Society.

Branch Electives are courses two from the DAS (Data and Systems) bucket and one from the AIT (AI Theory) bucket. The two from the DAS bucket, it is mandated to be data-centric and another system-centric. For the free electives, it is mandated that at least one belongs to AID (AI in data domains) and one belongs to AIX (AI in application domains). The third can belong to any of DAS/AIT/AID/AIX. The open elective can be any course offered by any department.

The current list of elective courses available are as follows:

- **DAS (data-centric):** Data Visualization, Data Modeling, Data Mining (to be introduced in Jan 2026).
- **DAS (system-centric):** NoSQL systems, Streaming data systems, Geographic Information Systems.
- **AI Theory:** Few-shot learning, Reinforcement learning, Self-supervised learning, Multi-objective Machine Learning, Multi-agent systems, Artificial General Intelligence (AGI)
- **AI in data domains:** Natural Language Processing, Visual Recognition, Advanced in NLP, Gen AI for vision, 3D Vision, Spatio-temporal data analytics I and II.
- **AI in application domains:** Medical Image Analysis, Spatial Computing, Recommendation Systems, Data Science for BFSI (to be introduced).
- Note: BFSI - Banking, Financial Services, and Insurance

Design of Elective course will be addressed in detail by the faculty concerned. This design of the course will be presented to Senate before being offered to students. Some of the Elective Courses may require a specific course(s) as a pre requisite.

6 Project Electives / Reading Elective

1. There are two forms of special electives called: Project Elective (PE) and Reading Elective (RE). These electives are intended for experiential and guided learning.

2. Every PE course at least have the following characteristics:
   - Overall Plan
   - Visible Output
   - Direct Supervision

3. PE and RE follow the usual letter grading pattern available to other courses.
4. MTech students may opt for two PE or RE type course in the entire programme duration Note: To clarify, one PE, one RE; two PE; two REs are all allowed.
5. Involvement of external institutional entities if any, as part of a PE course, should be expedited within the framework of the existing collaboration and IP policies of the Institute.

7 Thesis/Masters Project/Internship

Thesis/Masters Project/Internship shall be of 24 weeks duration and a student can accumulate 16 credits on successful completion of thesis or Masters Project.

For the students pursuing Masters Project/Internship:

- Masters Project to be considered as six months (not less than five months) of supervised project work carried out at industry or academic institutions.
- The Masters Project committee will ensure that a mid-term feedback is collected (for every student pursuing internship) to ensure smooth progress towards completion.
- At the time of Masters Project completion the Masters Project committee will also collect the certificate (satisfactory/unsatisfactory) from concerned person of the organization. If the certificate is unsatisfactory then the institute internship committee will review the matter and if they agree with the certificate given, and then the student has to carry on the internship again at same or different place. If the certificate is satisfactory then the student full fills the requirement of internship.

For students pursuing thesis, the following guidelines hold:

- There is an M.Tech. thesis committee comprising of the supervisor and at least two more faculty members. Members of this thesis committee will serve thesis and oral examiners for each student pursuing thesis.
- The thesis style rules should be available in LMS for all thesis students to use. Additionally, we should make available both Word and LaTeX style files, which comply by these rules. If a student chooses to use a word processor, other than the ones above, (s)he is welcome to do so as long as the rules are met.
- A soft copy of the thesis in pdf format should be sent to IIITB librarian, a week before the final submission of thesis date according to the institute's calendar (which will be after the thesis's oral exam). The soft copy of thesis format must be officially approved by the librarian before the thesis goes in print and for binding.
- The M.Tech. academic calendar will have dates fixed for the following tasks specific to thesis evaluation: constitution of thesis committee, submission of draft to the committee(s) (a week before the oral examination), a week dedicated for all the M.Tech. thesis defenses, date for submission of soft copy to the librarian, and a date for final submission of the hardbound thesis to the library.