भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

M.Tech. in Data Science (MDS)

Information Brochure (Year 2025)

Department of CSE

Indian Institute of Technology Hyderabad

Overview

Department of Computer Science and Engineering, IIT Hyderabad has introduced the MTech in Data Sciences (MDS) program in the Academic Year 2018. MDS is a self-paced program of 48 credits that can be taken over 3-4 years. Students will do 24 credits of coursework in the first two years. In the third year, they would two Capstone projects of 12 credits each. This is a self-paced course, where the students have the option of taking a lesser number of courses in different semesters and complete the course requirement in 2-3 years. Capstone Projects can be taken only after the course requirement is complete. If a student is not interested in doing the 24 credits of Capstone projects, then he/she can graduate with the Executive M.Tech. in Data Science (EMDS) degree. The earlier program offered by the institute along similar lines was called the EMDS program, where the students had to do 24 course credits. MDS is an extension to the EMDS program. MDS is a full MTech Program, and is equivalent to the other MTech programs offered by the institute. The number of credits done by the candidates in MDS program is same as the number of credits needed to be done by the students in other full MTech programs.

The Need for M.Tech. in Data Science Program

There are many applications, such as social media, healthcare, e-commerce, weather forecast, traffic monitoring, etc., that are producing massive amounts of data, the so-called "BIG DATA", with Volume, Velocity, Variety, Veracity and Value (the five "Vs" of Big Data challenges) at an unprecedented scale. This has led to a critical need for skilled professionals, popularly known as Data Scientists, who can mine and interpret the data. Making sense of this massive data is a very difficult challenge for scientific, technological and industrial disciplines.

Unfortunately, there is a gap between the demand and supply of data scientists and technologists. The following are the chief reasons behind this gap:
• Undergraduate courses are too generic for addressing issues in this area in a focused manner.
• There are not many postgraduate courses that focus explicitly on Data Science.
• Even if some generic postgraduate programs can be tailored to focus on Data Science through electives, professionals working in the industry or Research and Development establishments do not have the luxury of taking three years off to pursue higher studies.

With these factors in mind, the CSE Department at IIT Hyderabad proposes a three-year M.Tech. program in the Data Science area that is flexible and can be self-paced. This program is exclusively designed to cater to the needs of working individuals, wherein a candidate is expected to do eight 3-credit courses over a period of 2-3 years. Ideally, one can take two courses per semester. The classes will be held over the weekends (or other timings suitable for working professionals), with each class having a 3-hour duration. The classes can be attended remotely.

Eligibility Criteria and Admission Process

Duration	Self-paced over three to five years
Eligibility	1. This program is exclusively for professionals working in the industry.

	2. The candidate should have a BTech/BE degree in CS/EE/IT/ECE, or an MCA, an MSc/MS/ME/M.Tech. degree in CS/IT 3. At least 70% marks or 7.0 CGPA in one of the qualifying exams (BTech/BE in CS/EE/IT/ECE, or MCA, or MSc/MS/ME/M.Tech. in CS/IT) 4. By the date of the application deadline, the candidate must have at least three years of work experience in a relevant industry and be employed in the industry at the time of applying. Internship experience, teaching experience, and experience before completing the earliest qualifying degree (as listed above) are not counted. 5. Exceptional candidates with B.Tech./BE degree or an ME/M.Tech. degree in other disciplines will be considered, provided they have outstanding academic records and strong programming work experience in the industry (which should be clearly demonstrated in the application), and/or a strong background in data science/related areas (which should be clearly demonstrated in the application). The right to shortlist such candidates (with a different academic training background other than those listed in Point 2) will remain with IIT-H. The objective criteria regarding minimum experience and marks in the qualifying exam remain the same as mentioned above.
Selection Procedure	Candidates must fill out an online application. The selection will be based on written tests, followed by interviews. Candidates will be shortlisted for interviews based on written test performance.
Program Fee	Details of the fee structure can be found here

Important Dates:

- 18th March 2025: Application portal opens
- 1st week of May 2025: Announcement of list of shortlisted candidates satisfying the eligibility criteria
- 2nd/3rd week of May 2025: Written Test. Date/Time and mode to be informed later
- Till the end of June: Interviews
- Last week in June/First week of July: Announcement of selected candidates
- August 2025: Classes commence

Course Mode to pursue

The courses would be offered on Saturdays from 9:00 am – 5:00 pm, or Monday - Friday from 8:30 - 10:00 am. The time slot in which a course would be taught would be informed to students

beforehand to help them in deciding electives. The courses will be held online, and the students can join the class from anywhere in the world. The end-semester exams typically happen in the campus. Hence, the students might be required to travel to IITH once at the end of each semester in which s/he has taken a course.

Curriculum

The following table shows the curriculum for the MDS program for the 2021 Batch.

Semester	Course Title	Credits
Semester I	Mathematical Foundations of DS	3
	Elective 1	3
Semester II	Elective 2	3
	Elective 3	3
Semester III	Elective 4	3
	Elective 5	3
Semester IV	Elective 6	3
	Elective 7	3
Semester V	Capstone Project 1	12
Semester VI	Capstone Project 2	12

Tentative List of Elective Courses

The following table provides a tentative list of available elective courses.

Image and Video Analytics	Foundations of Machine Learning
Applied Machine Learning	Probabilistic Models for Machine Learning
Bayesian Data Analysis	Theory of Learning and Kernel methods
Natural Language Processing	Information Retrieval
Deep Learning	Programming Models for Multicore and GPU Architectures
Scaling to Big Data	Internet of Things

Please note that the above list is indicative and all the above courses may not be offered. The department may also introduce new courses and offer those as elective courses for the students. The syllabus of the courses will be provided to the students before course registration to help them to select the courses to register for.

About IIT Hyderabad

The Indian Institute of Technology, Hyderabad (IITH) was established in the year 2008 and is currently operating out of its permanent campus since 2015. The Institute has a sprawling permanent campus of about 570 acres at Kandi near Sangareddy in Medak; about 50 minutes' drive from the Rajiv Gandhi International Airport, Shamshabad.

Faculty and students are at the forefront of innovation - academic innovation and innovative research at IIT Hyderabad. Ranked 8th among Engineering institutes in the country, IIT Hyderabad has seen exponential growth in its number of publications, patents, funded projects, and centres of excellence. Within a very short time since its inception, IIT Hyderabad (IITH) has made significant strides in research as well as in pedagogy. IITH became operational on August 20, 2008 with three departments: CSE, EE & ME, with the first batch comprising of 111 B.Tech. students. IITH currently has 17 departments, which span across all the major departments found in any of the older IITs. The current student strength is approximately 4000. IITH has an equal number of students in its postgraduate and undergraduate programs, which is a testimony to its emphasis on becoming a leading world-class research institution. Today, IITH has more than 250 full-time world-class faculty members. Moreover, IITH has hosted several international faculty for research collaborations as well as teaching engagements.

IIT Hyderabad has BTech programs in 11 Engineering departments, MSc in Physics, Chemistry and Math, MPhil in Liberal Arts, MDes in Design, and PhD in all these departments. There is a strong emphasis on interdisciplinary academics—IITH offers a unique BTech program in Engineering Science to achieve interdisciplinarity. IITH has implemented a novel academic program called Fractal Academics: where the key idea is to atomize courses, provide breadth and depth, emphasize courses in liberal arts and creative arts, emphasize project work, and create an interactive learning ambience.

Many state-of-the-art laboratories have been established over the last few years at IITH. In all, there are more than 100 operational labs. IITH has nearly ₹650 crores of sponsored research and consultancy funding. On average, IITH faculty have published more than 500 journals and referred conference papers annually over the last few years, which will only increase in years to come.

IITH has a very strong collaboration with Japan at an institutional level in research and development, as well as in the architectural design of the permanent campus. This collaboration gives IITH a great impetus for quickly being among the world leaders in cutting-edge research. IITH already has some transdisciplinary centers, such as the Center for Nano-X, X-Materials Center, Center for Sustainable Development, Center for IoT and Cyber-Physical Systems, Center for High-Performance Computing, and Center for Smart Cities. IITH also has strong industry collaborations, both at national and international levels. Besides, IITH has MoUs and active collaborations with several leading US universities and Japanese Universities. IITH has had several visiting faculty from USA, France, and Canada who have taught short-duration (Fractional Credit) courses. IITH aims to create an environment that fosters innovation and invention and seeks to realize the dreams of aspiring top-class students: dreams for higher knowledge, dreams for scientific inquiry, dreams for technology creation, dreams for co-curricular activities, and dreams to change the world.

About Department of CSE, IIT Hyderabad

As IITH completes the thirteenth year of its existence, the Department of Computer Science and Engineering (CSE) has made rapid progress and is continuing to establish itself through state-of-the-art research and teaching. The department comprises of twenty-six faculty members with expertise in various research areas, including theoretical computer science, algorithms, graph theory, networking, distributed systems, compilers, machine learning, image/video processing, computer architecture and software verification. In addition to the regular B.Tech, M.Tech and PhD programs, the CSE department has been successfully running the EMDS program for working professionals, and was actively involved in mentoring the CSE department of IIT Bhilai. Since 2018, the department has been offering an extended version of the EMDS program. This new program is called MTech in Data Science (MDS) and is open to industry professionals. The department faculty members are recipients of substantial research grants from government agencies like SERB/DST/MHRD, DST-JST, JICA and industry partners such as Google, Microsoft, Intel, IBM, and AMD. The department also secured DST-FIST grant of Rs. 2 Crores to further augment R&D infrastructure. Faculty members of the CSE department published papers in top-tier venues e.g., AAAI, WACV, NeurIPS, KDD, ICDM, UAI, CIKM, ICML, ACL, ICLR, STOC, CVPR, CP etc. Several faculty members have received individual accolades in terms of recognition and fellowships from the government as well as industrial establishments. The students and alumni of CSE have continued to excel. Alumni of CSE have secured admissions graduate programs at top universities such as MIT, Princeton, and CMU. Students have also received prestigious competitive awards such as Facebook AI Residency fellowship, Google AI Residency fellowship program, Google PhD Fellowship, S.N. Bose Fellowship, Honda Young Engineer and Scientist Award, and TCS scholarship. To learn more about the department and the research interests of the faculty, please visit https://cse.iith.ac.in/.

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