INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

The Centre for Machine Intelligence and Data Science (C-MInDS)

M.S. by Research

INFORMATION BROCHURE

2022-23

About Institute

Indian Institute of Technology Bombay is one of the twenty-three national institutes of technology in the country set up with the objectives of making available the facilities for higher education, research and training in various fields of science and technology. Indian Institute of Technology Bombay was established in 1958 with the co-operation and participation of the erstwhile Government of USSR under UNESCO's Technical Assistance Programme.

The Institute is located at Powai, a suburb of Mumbai, on a campus spread over about 480 acres amidst picturesque surroundings with Vihar and Powai lakes on its either side. At present, it has eleven science and technology departments including Department of Humanities and Social Sciences (HSS) and fifteen interdisciplinary groups/centres/schools which offer various undergraduate, postgraduate and doctoral programmes of studies.

Student Amenities

The Institute is mostly residential and has 18 hostels for students. Each hostel is an independent entity with its own mess and recreation facilities. The Students' Gymkhana is very well equipped to provide facilities for sports, cultural programmes, National Social Service (NSS) and other extra-curricular activities. The various clubs at the Gymkhana and the Student Activity Centre encourage students to develop their talents in painting, music, photography, modelling and fabrication. The Institute also has good swimming pools on the campus.

Centre for Machine Intelligence & Data Science (C-MinDS) is one of the more recent centres set up by the Institute. It will start its MS by Research programme from the Autumn semester of 2022.

M.S. by Research Admissions

M.S. by Research is a new program in the Center for Machine Intelligence and Data Science (MInDS) and is similar to the MS program that was recently started in Computer Science and Engineering. The program is designed for students who wish to explore a career in R&D, and can serve as a first step either towards a Ph.D. or towards a high-end R&D oriented career in industry. Admissions to the M.S. by Research programme in CMInDS will be available in the TA category, which is funded by the institute, as well as in the RAP category, where the student works with a faculty member on an R&D project which funds the student's stipend. The duration of the program is flexible ranging from a minimum of 1.5 years to a maximum of 3 years

In conformance with the interdisciplinary mandate of the center, the program will be open to students with a bachelor's degree in all engineering disciplines. Further, the program itself will include a mix of breadth courses in fundamentals of AI/DS, and application-specific courses to focus on the application of AI/ML to many conventional disciplines. These are called streams and include topics like Finance, Visual computing, Languages and Speech, Health & Biology, Infrastructure Engineering, and Process Engineering. More application areas are expected to be added. A student is free to not choose any specialization stream, and work towards a generic degree.

Please direct all queries related to Cutoffs, Shortlisting criteria, hostel accommodation and certificate submissions for admission to pgadm@iitb.ac.in

Name of the degree

A student will be given a degree in **MS by Research in Data Science and Artificial Intelligence.**

Admission Criteria

(i). B.E./B.Tech./AMIE or equivalent in any engineering discipline. (ii). M.Sc. or equivalent in any science discipline. (iii). MCA (with Physics & Mathematics at B.Sc. level) or equivalent

Gate: Valid GATE score (any engineering discipline) is required for all applicants except commissioned officers of the armed forces and those having B.Tech. Degree from IITs with CGPA/CPI of 8.00 (on 0-10 scale) and above.

The Center may additionally conduct an interview or written test to further shortlist the candidates.

Number admitted

Twenty students in the TA category. Additional students may be admitted in the RAP category. Students in the TA category will support courses taken by CMInDS students. The students in the RAP category will be funded by projects of the faculty with whom the student engages in projects. The curriculum will not distinguish between TA and RAP category students since it is designed to provide students and guides with enough flexibility from the start. The students in the TA category too will be supported by the center or the thesis advisor after two years.

Graduation requirements

The Master's degree requires:

- Completion of five breadth courses. The five breadth areas are:
    a. Probability and Statistics
    b. Computing
    c. Optimization
    d. AI/ML Core
    e. Linear Algebra
- Completion of a 4-credit seminar and a communication skills course.
- Completion of a 6 credit MS R&D
- Completion of a MS Thesis. Note the Thesis does not have a credit attached to it. The thesis allocation will begin at the end of second semester so students start on their thesis from the first summer of their MS program.
- Completion of five elective courses in AI/ML and streams area
- An IIT Bombay BTech can apply for waiver of courses in the MS by Research program if he/she has taken those courses as part of their BTech/Minor curriculum, and obtained at least a BB in the course. Up to a maximum of seven courses can be waived. Thus, as part of the MS program the student needs to, at the very minimum, take two courses, a seminar, the MS R&D, and the communication skills course. DPGC will review waiver applications on a case by case basis and send to the Academic office for approval.

Credit Structure for MS in AI and Data Science

For TA Category students.

Semester-I		**Semester-2**		**Semester-3**		**Semester-4 to 6**		Total Credits
Between 18 and 30 credits		Between 16 to 28 credits		Between 12 to 18 credits		Between 0 and 12 credits		
Computing (Core)	6	Seminar	4	Elective IV	6	MS Thesis		
Probability & statistics (Core)	6	Optimization (Core)	6	Institute elective	6			
Linear algebra (Core)	6	Elective II	6	MS Thesis				
AI/ML Core (Core)	6	Elective III	6					
Elective I	6	MS R&D	6					
Communication skill								
Total	30		28		12			70

Breadth courses can be taken in either of the two semesters.

For RA Category students.

Semester-I		**Semester-2**		**Semester-3**		**Semester-4 to 6**		Total Credits
Between 12 and 30 credits		Between 10 to 28 credits		Between 6 to 18 credits		Between 0 and 12 credits		
Computing (Core)	6	Seminar	4	Elective IV	6	MS Thesis		
Probability & statistics (Core)	6	Optimization (Core)	6	Institute elective	6			
Linear algebra (Core)	6	Elective II	6	MS Thesis				
AI/ML Core (Core)	6	Elective III	6					
Elective I	6	MS R&D	6					
Communication skill								
Total	30		28		12			70

Breadth courses can be taken in either of the two semesters. Only difference with TA category is that the minimum credits per semester has been reduced.

Course types	**Semester 1**	**Semester 2**	**Semester 3**	**Semesters 4-6**	**Total Credits**
Core courses	**24**	**16**			**50**
Communication Skill course	**6 (PP/NP course)**				**-**
Electives	**6**	**12**	**6**		**24**
Institute Elective			**6**		**6**
MS thesis			**0**		
Total credits	**30**	**28**	**12**		**70**

Fees, Deposits & Hostel Rent for M.S. by Research (Data Science and Artificial Intelligence in CMInDs) Students (subject to revision as per MHRD/BoG decision)

- **as available on the following webpage**

https://www.iitb.ac.in/newacadhome/FeesStructure.jsp under https://www.iitb.ac.in/newacadhome/PGNewEntranceFeeStructureAutumnSem2022-23.pdf & https://www.iitb.ac.in/newacadhome/HostelFeeCircular.pdf