

(As on 27/03/2026)

Department of Engineering Design
Indian Institute of Technology Madras
Branch Code: ED
Credit Requirements for M.Tech. in Robotics (MR)

Course Curriculum Semester Wise:

Semester 1

S. No.	Course No.	Course Name	L	T	E	P	O	C
1	ID6040	Core 1: Introduction to Robotics	4	0	0	0	8	12
2		Core 2						*
3		Elective 1**						*
4		Elective 2**						*
5		Elective 3**						*
6	GN5003	Personal and Professional Growth	1	0	0	0	2	0
		Total						12**

Semester 2

S. No.	Course No.	Course Name	L	T	E	P	O	C
1	ID6071	Core 3: Robot Control	4	0	0	0	8	12
2	ID6100	Core 4: Robotics Lab	0	0	0	3	2	5
3		Core 5						*
4		Elective 4**						*
5		Elective 5**						*
6		Elective 6**						*
7	ID5201	Core 6: Robotics Seminar	1	0	0	0	0	1
		Total						18**

Semester 3

S. No.	Course No.	Course Name	L	T	E	P	O	C
1	EDXXXX	Project I#						40
2		Elective *						*

Semester 4

S. No.	Course No.	Course Name	L	T	E	P	O	C
1	EDXXXX	Project II#						45

Semester	I	II	Summer	III	IV	Total
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Credits	12**	18**	0	40*	45	115 + 18 credits(min) worth other core courses + Electives (min. 57 credits) = Total 190 credits
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Indicated credits are only for the core programme. In addition, a minimum of 18 core credits from the list of core courses listed below and a minimum of 57 elective credits must be credited from the list of electives listed below.

** The semester-wise breakup of the electives is just for preliminary guidance. The students are advised to consult the faculty advisor to decide on the number of electives to be taken in each of the three semesters.

One of the project guides should be from the Department of Engineering Design

Project Phase-1 is mandated for all students. On the other hand, Project Phase 2, which is the continuation of Phase 1, can be pursued only if the evaluation committee approves it.

At the end of Project Phase-1, the student should submit a report and make a presentation. The committee will then recommend whether the student is eligible to pursue Project Phase 2. If the student is not found eligible, additional coursework from the list of electives must be done to meet the total credit requirements for obtaining the M.Tech degree.

LIST OF CORE COURSES

CORE COURSES

Students are suggested to contact their faculty and/or research advisor to choose appropriate CORE courses.

Sr. No	Course No	Course Name	L	T	E	P	O	C
1	ED6007	Mechanics of Robots	4	0	0	0	8	12
2	ED5315	Field and Service Robotics	3	0	0	0	6	9
3	ED5215	Introduction to Motion Planning	3	0	0	0	6	9

LIST OF ELECTIVES

Elective Courses

Students are required to take at least one elective from each basket.

Basket 1

Sr. No	Course No	Course Name	L	T	E	P	O	C
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1.	AM5010	Biomechanics	3	0	0	0	6	9
2.	AM5011	Virtual Reality Engg.	3	0	0	0	6	9
3.	AM5190	Haptics in Biomedical Engg	3	0	0	0	6	9
4.	AS5010	Aerodynamics and Aircraft Performance	3	0	0	0	6	9
5.	AS5012	Dynamics and control of rotorcraft	3	0	0	0	6	9
6.	AS5040	Flight Mechanics	4	0	0	0	8	12
7.	AS5340	Advanced flight mechanics	3	0	0	0	6	9
8.	AS5545	Dynamics and Control of Spacecraft	3	0	0	0	6	9
9.	AS5570	Principles of Guidance for Autonomous Vehicles	3	0	0	0	6	9
10.	CE6011	Smart buildings and automation	3	0	0	0	6	9
11.	ED5040	Human Anatomy Physiology and Biomechanics	4	0	0	0	8	12
12.	ED5160	Automotive systems	4	0	0	0	8	12
13.	ED5314	Design, analysis and control of Robot Manipulators	3	0	0	0	6	9
14.	ME6221	Theory of Mechanisms	3	0	0	0	6	9
15.	ME7010	Microprocessor in automation	3	0	0	0	6	9

Basket 2

Sr. No	Course No	Course Name	L	T	E	P	O	C
1.	CS5011/ EE5177	Machine Learning for Computer Vision	4	0	0	0	8	12
2.	CS5691	Pattern Recognition and Machine Learning	3	0	0	0	6	9
3.	CS6350/ EE5175	Computer Vision/ Image Signal Processing	4	0	0	0	8	12
4.	CS6380	Artificial intelligence	4	0	0	0	8	12
5.	CS6777	Optimisation for computer vision applications	4	0	0	0	8	12
6.	CS6910	Fundamentals of Deep Learning	3	0	0	0	6	9
7.	CS7015	Deep Learning	4	0	0	0	8	12
8.	DA6400	Introduction to Reinforcement Learning	8	0	0	0	8	12
9.	ED5330	Control of Automotive Systems	3	0	0	0	6	9
10.	EE5340	Micro-electromechanical systems	3	0	0	0	6	9
11.	EE5410	Introduction to DSP	4	0	0	0	8	12
12.	EE5413	Linear Dynamical Systems	4	0	0	0	8	12

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13.	EE5541	Synthesis of control systems	3	0	0	0	6	9
14.	EE6412	Optimal Control	4	0	0	0	8	12
15.	EE6415	Nonlinear Control Systems	3	0	0	0	6	9
16.	EE6417	Allied topics in control systems	3	0	0	0	6	9
17.	EE6419	Geometric Nonlinear Control Theory	3	0	0	0	6	9
18.	ID5030	Machine Learning for Engineering and Science Applications	3	1	0	0	6	10
19.	OE5510	Machine Learning for Ocean Engineers	3	0	0	0	6	9
20.	OE5005	Marine Autonomous Vehicles	3	1	0	0	6	10
21.	OE5011	Marine Robotics	3	0	0	0	6	9
22.	OE5310	Guidance & Control of Marine Vehicles	3	0	0	0	6	9