Executive M.Tech - Applied Mechatronics and Robotics

About the Program

The Executive M.Tech program in Applied Mechatronics and Robotics at IIT Bhilai is designed to develop expertise in integrating mechanical, electrical, and computational systems for advanced robotics and automation solutions. The program emphasizes interdisciplinary learning and the synergic knowledge to solve real-world problems in industries such as manufacturing, aerospace, healthcare, and autonomous systems.

The flexible curriculum offers online classes, electives, and project-based learning, catering to professionals aspiring to advance their careers in robotics, automation, and mechatronics domains.

Program Learning Objectives (PLOs)

	Learning Objective
PLO1	Develop a strong understanding of mechatronics and robotics fundamentals, including sensors and actuators.
PLO2	Gain knowledge in designing and controlling robotic systems using advanced control techniques.
PLO3	Apply computational tools and machine learning techniques for robotics and automation systems.
PLO4	Understand interdisciplinary integration of mechanical, electrical, and computational domains in robotics.
PLO5	Foster innovation in designing automation solutions for industrial and research applications.
PLO6	Build problem-solving and leadership skills for leading multidisciplinary teams in robotics projects.

Program Outcomes (POs)

	Program Outcome
PO1	Demonstrate expertise in designing and analyzing mechatronic systems and robotics.
PO2	Apply control theory and automation techniques to create efficient robotic systems.
PO3	Utilize advanced AI and machine learning tools for robotics, including path planning and navigation.
PO4	Address real-world challenges in robotics with sustainable and ethical solutions.
PO5	Effectively communicate technical solutions and project outcomes to diverse stakeholders.
PO6	Exhibit a commitment to lifelong learning, staying updated with emerging robotics and automation trends.

COURSE STRUCTURE FOR M.Tech. (MR)

Semester - I (Total Credits – 9)

Course Code	Course Name	L	T	P	C	Category
MR01	Introduction to Mechatronics	2	0	0	2	Core Course
MR02	Mechanisms for Robotic Systems	2	0	0	2	Core Course
MR03	Modern Control Systems	2	0	0	2	Core Course
MR04	Artificial Intelligence	2	1	0	3	Core Course

Semester – II (Total Credits – 9)

Course Code	Course Name	L	T	P	C	Category
MR05	Robotics system	2	0	0	2	Core Course
MR06	Sensors and actuators for Robotics	2	0	0	2	Core Course
MREXX	Electives in ME/EE/DSAI with 5					Elective

Semester – III (Total Credits – 10)

Course Code	Course Name	L	T	P	C	Category
MREXX	Electives in MT&R with 6					Elective
MREXX	Electives in EE/ME/DSAI with credit 4					Elective

Or

MREXX	Electives in MT&R with 6					Elective
MRC01	Campus Immersion	0	0	4	2	Campus Immersion
MREXX	Electives in EE/ME/DSAI with credit 2					Elective

Semester - IV (Total Credits – 12)

Course Code	Course Name	L	T	P	C	Category
MRP02	Capstone project	0	0	24	12	Project

OR

MRT01*	Thesis	x	x	x	12	Mtech thesis

Semester – V* (Total Credits – 14)

Course Code	Course Name	L	T	P	C	Category

MRT01*	Thesis	x	x	x	14	MTech thesis

Semester - V - Total Credits - 14

***Only for those who have opted for equivalent degree to the regular Mtech program**

Students registered only for the executive Mtech Program
Total Credits: Semester - I + Semester - II + Semester - III + Semester - IV
Total Credits: 9 + 9 + 10 + 12=40
Students opted for equivalent degree to the regular Mtech program
Total Credits: Semester - I + Semester - II + Semester - III + Semester – IV+ Semester-V
Total Credits: 9 + 9 + 10 + 12+14=54

Additional Notes:

Campus Emersion:
If opted, it will be conducted offline and may also contribute to lab credit requirements. (Campus immersion will run if more than 25 students opt for it)

Program Equivalency:
The Executive MTech (Online) Program is not equivalent to the regular offline MTech program at IIT Bhilai.

Thesis Requirements:
To achieve equivalency with the regular offline MTech program, the candidate must complete a total of 26 thesis credits on campus starting from forth semester onwards.

Tentative bucket for Electives

Category	Sem	Course	Course Name	L	T	P	C

		Code					
Electives in EE	II/III	MRE01	Advanced Control Theory	2	0	0	2
	II/III	MRE02	Signal Interface Circuits	2	0	0	2
	II/III	MRE03	Digital System	2	1	0	3

Category	Sem	Course Code	Course Name	L	T	P	C
	II/III	MRE04	Intelligent Mechanical System	2	0	0	2
Electives in ME	II/III	MRE06	Industrial Automation	2	0	0	2
	II/III	MRE07	Smart material and structures	2	0	0	2
	II/III	MRE00	Soft Computing	2	0	0	2

Category	Sem	Course Code	Course Name	L	T	P	C
Electives in DSAI	II	MRE08	Internet of Things	3	0	0	3
	II	MRE09	Machine Learning	2	0	2	3
	II	MRE11	Reinforcement Learning	2	0	0	2
	II	MRE12	Natural Language Processing for Robotics	2	1	0	3

Category	Sem	Course Code	Course Name	L	T	P	C
Electives in MT&R	III/IV	MRE14	UAV Guidance & Navigation	2	1	0	3
	III/IV	MRE15	Industry 4.0	2	0	0	2
	III/IV	MRE16	Machine Vision for Robotics	3	0	0	3
	III/IV	MRE17	Autonomous Vehicles	2	1	0	3
	III/IV	MRE18	Microcontroller and Microprocessor	3	0	0	3