

## Scheme of Teaching and Examination for M.Tech (Autonomous Scheme: 2022)

### I SEMESTER – M.Tech in Robotics and Mechatronics

Sl. No.	Course Area	Course Code	Course Name	Teaching Department	Contact Hours / week			Examination				Credits
					Theory	Practical	Tutorial / SDA	Duration (Hrs.)	CIE Marks	SEE Marks	Total Marks	
					L	P	T/SDA					
1	BS	22MRM11	Advanced Mathematics	Mathematics	3	0	0	3	50	50	100	3
2	IPC	22MRM12	Robot Programming	ME	3	2	0	3	50	50	100	4
3	PC	22MRM13	Mechatronics System Design	ME	3	0	2	3	50	50	100	4
4	PC	22MRM14	Industrial Robots	ME	3	0	0	3	50	50	100	3
5	PC	22MRM15	3D Printing	ME	3	0	0	3	50	50	100	3
6	PC	22MRM16	Research Methodology and IPR	ME	3	0	0	3	50	50	100	3
7	PC	22MRML17	Robotics Lab	ME	1	2	0	3	50	50	100	2
8	AEC	22AEC18	Online courses	-	Classes and evaluation procedures are as per the policy of the online course providers.							PP
<b>TOTAL</b>					<b>19</b>	<b>4</b>	<b>2</b>	<b>21</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>22</b>

**Integrated Professional Core Course (IPC):** Refers to Professional Theory Core Course Integrated with practical of the same course. The theory part of the IPC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE).

**Ability Enhancement Courses Suggested by BOS (ONLINE courses):**

Ability Enhancement Courses will be suggested by the BoS.

- These courses are prescribed to help students to enhance their skills in in fields connected to the field of specialization as well allied fields that leads to employable skills. Involving in learning such courses are impetus to lifelong learning.
- The courses under this category are online courses published in advance and approved by the concerned Board of Studies.
- Registration to Ability Enhancement Course shall be done in consultation with the mentor and is compulsory during the concerned semester.
- In case a candidate fails to appear for the proctored examination or fails to pass the selected online course, he/she can register and appear for the same course if offered during the next session or register for a new course offered during that session, in consultation with the mentor.
- The Ability Enhancement Course carries no credit and is not counted for vertical progression. However, a pass in such a course is mandatory for the award of the degree.

BS: Basic Science	OE : Open Electives	CREDIT Definition
IPC: Integrated Professional Core	AEC: Ability Enhancement Course (A pass in AEC is mandatory for the award of the degree)	1 hour Lecture per week per semester = 1 credit
PC: Professional Core	PRI: Project & Internship	2 hours Tutorials / SDA per week per semester = 1 credit
PE : Professional Electives	SDA: Skill Development Activity	2 hours Practical / lab per week per semester = 1 credit

**Skill Development Activities:**

Under Skill development activities in a concerning course, the students should

1. Interact with industry (small, medium, and large).
2. Involve in research/testing/projects to understand their problems and help creative and innovative methods to solve the problem.
3. Involve in case studies and field visits/ fieldwork.
4. Accustom to the use of standards/codes etc., to narrow the gap between academia and industry.
5. Handle advanced instruments to enhance technical talent.
6. Gain confidence in modelling of systems and algorithms for transient and steady-state operations, thermal study, etc.
7. Work on different software/s (tools) to simulate, analyze and authenticate the output to interpret and conclude.

All activities should enhance student's abilities to employment and/or self-employment opportunities, management skills, Statistical analysis, fiscal expertise, etc. Students and the course instructor/s to involve either individually or in groups to interact together to enhance the learning and application skills of the study they have undertaken. The students with the help of the course instructor can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

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### II SEMESTER – M.Tech in Robotics and Mechatronics

Sl. No.	Course Area	Course Code	Course Name	Teaching Department	Contact Hours / week			Examination				Credits
					Theory	Practical / Mini project	Tutorial / SDA	Duration (Hrs.)	CIE Marks	SEE Marks	Total Marks	
					L	P	T/SDA					
1	PC	22MRM21	Design of Robotic Systems	ME	3	0	0	3	50	50	100	3
2	IPC	22MRM22	Programmable Logic Controllers	ME	3	2	0	3	50	50	100	4
3	PE	22MRM23X	Professional Elective-I	ME	3	0	0	3	50	50	100	3
4	PE	22MRM24X	Professional Elective-II	ME	3	0	0	3	50	50	100	3
5	PRI	22MRM25	Mini Project with Seminar	ME	0	4	2	-	100	-	100	3
6	PC	22MRML26	3D Printing Lab	ME	1	2	0	3	50	50	100	2
7	AEC	22AEC27	Online courses	-	Classes and evaluation procedures are as per the policy of the online course providers.						PP	
<b>TOTAL</b>					<b>13</b>	<b>8</b>	<b>2</b>	<b>15</b>	<b>350</b>	<b>250</b>	<b>600</b>	<b>18</b>

**Note:**

**1. Mini Project with Seminar:**

This may be hands-on practice, survey report, data collection and analysis, coding, mobile app development, field visit and report preparation, modelling of system, simulation, analysing and authenticating, case studies, etc.

CIE marks shall be awarded by a committee comprising of HOD as Chairman, Guide/Co-guide, if any, and a senior faculty of the department. Students can present the seminar based on the completed mini-project. Participation in the seminar by all postgraduate students of the program shall be mandatory.

The CIE marks awarded for Mini-Project with Seminar, shall be based on the evaluation of Mini Project work and Report, Presentation skill and performance in Question and Answer session in the ratio 50:25:25. Mini-Project with Seminar shall be considered as a head of passing and shall be considered for vertical progression as well as for the award of degree. Those, who do not take-up/complete the Mini Project with Seminar shall be declared as fail in that course and have

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to complete the same during the subsequent semester. There is no SEE for this course.

## 2. Internship:

All the students shall have to undergo a mandatory internship of 06 weeks during the vacation of II and III semesters. A University examination shall be conducted during III semester and the prescribed internship credit shall be counted in the same semester. The internship shall be considered as a head of passing and shall be considered for vertical progression as well as for the award of degree. Those, who do not take-up/complete the internship shall be declared as fail in the internship course and have to complete the same during the subsequent University examination after satisfying the internship requirements.

Professional Elective-I		Professional Elective-II	
Course Code under 22MRM23X	Course title	Course Code under 22MRM24X	Course title
22MRM231	Artificial Intelligence for robots	22MRM241	Micro and Smart Systems
22MRM232	Robot based Industrial Automation	22MRM242	Bio-mechatronics
22MRM233	Safety and Security of Mechatronics System	22MRM243	Machine Learning
22MRM234	Robot Economics	22MRM244	Printed Circuit Board Design
22MRM235	Drives and Control Systems for Robots	22MRM245	Virtual Instrumentation

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### III SEMESTER – M.Tech in Robotics and Mechatronics

Sl. No.	Course Area	Course Code	Course Name	Teaching Department	Contact Hours / week			Examination				Credits
					Theory	Practical /Project/ Internship	Tutorial/ SDA	Duration (Hrs.)	CIE Marks	SEE Marks	Total Marks	
					L	P	T/SDA					
1	PC	22MRM31	Robotic Sensors	ME	3	0	2	3	50	50	100	4
2	PE	22MRM32X	Professional Elective-III	ME	3	0	0	3	50	50	100	3
3	OE	22MRM33X	Open Elective-I	ME	3	0	0	3	50	50	100	3
4	PRI	22MRM34	Project Work Phase -I	ME	0	6	0	-	100	-	100	3
5	PRI	22MRM35	Societal Project	ME	0	6	0	-	100	-	100	3
6	PRI	22MRM36	Internship	ME	(06 weeks Internship Completed during the intervening vacation of II and III semesters.)			3	50	50	100	6
<b>TOTAL</b>					<b>9</b>	<b>12</b>	<b>2</b>	<b>12</b>	<b>400</b>	<b>200</b>	<b>600</b>	<b>22</b>

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<b>IPC:</b> Integrated Professional Core	<b>AEC:</b> Ability Enhancement Course (A pass in AEC is mandatory for the award of the degree)	1 hour Lecture per week per semester = 1 credit
<b>PC:</b> Professional Core	<b>PRI:</b> Project & Internship	2 hours Tutorials / SDA per week per semester = 1 credit
<b>PE :</b> Professional Electives	<b>SDA:</b> Skill Development Activity	2 hours Practical / lab per week per semester = 1 credit

**Note:****1. Project Work Phase-I:**

The project work shall be carried out individually. However, in case a disciplinary or interdisciplinary project requires more participants, then a group consisting of not more than three shall be permitted.

Students in consultation with the guide/co-guide (if any) in disciplinary project or guides/co-guides (if any) of all departments in case of multidisciplinary projects, shall pursue a literature survey and complete the preliminary requirements of the selected project work. Each student shall prepare a relevant introductory project document and present a seminar.

CIE marks shall be awarded by a committee comprising of HOD as Chairman, all Guide/s and co-guide/s (if any) and a senior faculty of the concerned departments. The CIE marks awarded for project work phase -I, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

**2. Societal Project:**

Students in consultation with the internal guide as well as with external guide (much preferable) shall involve in applying technology to workout/proposing viable solutions for societal problems.

CIE marks shall be awarded by a committee comprising of HOD as Chairman, Guide/co-guide if any, and a senior faculty of the department. The CIE marks awarded, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

Those, who have not pursued /completed the Societal Project, shall be declared as fail in the course and have to complete the same during subsequent semester/s after satisfying the Societal Project requirements. There is no SEE (University examination) for this course.

**3. Internship:**

Those, who have not pursued /completed the internship, shall be declared as fail in the internship course and have to complete the same during subsequent University examinations after satisfying the internship requirements. Internship SEE (University examination) shall be as per the University norms.

CIE marks shall be awarded by a committee comprising of HOD as Chairman, Guide/co-guide if any, and a senior faculty of the department. The CIE marks awarded for project work phase -1, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

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Professional Elective-III		Open Elective-I	
Course Code under 22MRM32X	Course title	Course Code under 22MRM33X	Course title
22MRM321	Industrial Internet of Things	22MRM331	Entrepreneurship Development
22MRM322	Automotive Electronics	22MRM332	Additive manufacturing
22MRM323	Work Systems Engineering	22MRM333	Agile Manufacturing
22MRM324	Computer Applications in Design	22MRM334	Industrial Robots
22MRM325	Digital Image processing and Machine vision	22MRM335	Drives and control systems for Automation

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### IV SEMESTER – M.Tech in Robotics and Mechatronics

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					Theory	Practical /Project	Tutorials / SDA	Duration (Hrs.)	CIE Marks	SEE Marks	Total Marks	
					L	P	T/SDA					
1	PRI	22MRM41	Project Work Phase -II	ME	0	8	0	3	100	100	200	18
<b>TOTAL</b>					<b>0</b>	<b>8</b>	<b>0</b>	<b>3</b>	<b>100</b>	<b>100</b>	<b>200</b>	<b>18</b>

**Note:**

**1. Project Work Phase-II:**

Students in consultation with the guide/co-guide (if any) in disciplinary project or guides/co-guides (if any) of all departments in case of multidisciplinary projects, shall continue to work of Project Work phase -I to complete the Project work. Each student / batch of students shall prepare project document and present a seminar.

CIE marks shall be awarded by a committee comprising of HOD as Chairman, all Guide/s and co-guide/s (if any) and a senior faculty of the concerned departments. The CIE marks awarded for project work phase -II, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

SEE shall be at the end of IV semester. Project work evaluation and Viva-Voce examination (SEE), after satisfying the plagiarism check, shall be as per the University norms.

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