



SSN School of Engineering

DEPARTMENT OF MECHANICAL ENGINEERING

**Master of Technology
Manufacturing Engineering and Automation**

CURRICULUM

REGULATIONS 2026

VISION AND MISSION OF THE DEPARTMENT

VISION

To be an eminent centre of excellence in the field of Mechanical Engineering where education, research and innovation synergize to nurture competent professionals to meet global technological and societal challenges.

MISSION

- To provide quality education that equips students with strong fundamentals and practical skills in Mechanical Engineering.
- To foster and disseminate research in various fields of Mechanical Engineering to promote technological advancement.
- To collaborate with industries through research and consultancy to nurture knowledge transfer.
- To cultivate professional ethics, teamwork and social responsibility among students.
- To encourage innovation and entrepreneurship among students to transform ideas into sustainable technologies.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: To excel as manufacturing/automation engineers in industries and research organizations leading to successful professional career or entrepreneurship.

PEO 2: To pursue higher studies, research, professional development, and lifelong learning to keep abreast with current technological advancements.

PEO3: To demonstrate professional standards, ethical practices, and commitment to social and environmental responsibilities.

PROGRAM OUTCOMES (POs)

Program outcomes are the skills and knowledge which the students should have acquired at the time of graduation. A program outcome indicates what a student can do from course-wise knowledge acquired during the program. Students who graduate from this program shall exhibit the following.

PO1: To independently carry out research /investigation and development work to solve practical problems.

PO2: To write and present a substantial technical report/document.

PO3: To demonstrate a degree of mastery in the areas of manufacturing processes, robotics, automation, materials, industrial engineering, and product design.

PO4: To apply ethical principles and environmental guidelines to address societal, environmental, and sustainability related issues.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Apply knowledge of science, engineering, and sustainability principles to model, design, and analyze the advanced manufacturing systems.

PSO 2: Identify, formulate, review research literature, and analyze complex problems in manufacturing, robotics, and automation.

PEO / PO-PSO Mapping:

	PO/PSO					
	PO1	PO2	PO3	PO4	PSO1	PSO2
PEO1	2	3	3	2	3	3
PEO2	2	3	3	2	3	3

Mapping Programme Outcomes with Graduate Attributes

S.No	NBA-GA	ME Manufacturing PO
1	Scholarship of knowledge	3
2	Critical thinking	1
3	Problem solving	3
4	Research skill	1
5	Usage of modern tools	3
6	Collaborative and multidisciplinary research	1
7	Project management and finance	1
8	Communication	2
9	Life-long learning	3
10	Ethical practices and social responsibility	4
11	Independent and reflective learning	1

Washington Accord Knowledge Levels (WK)	Attributes
WK1	Natural sciences and social sciences
WK2	Conceptually based mathematics
WK3	Engineering fundamentals
WK4	Engineering specialist knowledge
WK5	Engineering design and operations
WK6	Engineering Practice (Technology)
WK7	Engineering knowledge in society, public safety and sustainable development
WK8	Research based knowledge
WK9	Professional ethics, inclusive behaviour and conduct

Complex Engineering Problems (WP)	Attributes
WP1	Depth of knowledge required
WP2	Range of conflicting requirements
WP3	Depth of analysis required
WP4	Familiarity of issues
WP5	Extent of applicable codes
WP6	Extent of stakeholder involvement and conflicting requirements
WP7	Interdependence

Complex Engineering Activities (EA)	Attributes
EA1	Range of resources
EA2	Level of interactions
EA3	Innovation

EA4	Consequences to the society and environment
EA5	Familiarity

Sustainable Development Goals (SDG)	Details	Sustainable Development Goals (SDG)	Details
SDG 1	No poverty	SDG 10	Reducing inequality
SDG 2	Zero hunger	SDG 11	Sustainable cities and communities
SDG 3	Good health and well-being	SDG 12	Responsible consumption and production
SDG 4	Quality education	SDG 13	Climate action
SDG 5	Gender equality	SDG 14	Life below water
SDG 6	Clean water and sanitation	SDG 15	Life on land
SDG 7	Affordable and clean energy	SDG 16	Peace, justice and strong institutions
SDG 8	Decent work and economic growth	SDG 17	Partnerships for the goals
SDG 9	Industry, innovation, and infrastructure		

COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

Sl. No	Broad Category of Course	Minimum Credit Requirement
1	Department Core Course (DC)	10
2	Major Core Course (MC)	30
3	Multidisciplinary Course (MD)	10
4	Open Elective (OE)	2
5	Project Dissertation (PD)	20
6	Research Internship (RI)	4
7	Skill Enhancement Course (SEC)	4
Total		80

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

Semester\Category	DC	MC	MD	OE	PD	RI	SEC	TOTAL
I	7	8	4	2	-	-	2	23
II	3	14	3	-	-	-	2	22
III	-	8	3	-	8	4	-	23
IV	-	-	-	-	12	-	-	12
Total	10	30	10	2	20	4	4	80

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW& SL	TH	C
1		Computational Methods and Optimization Techniques in Manufacturing	MD	4	45	30	0	45	120	4
2		Advances in Casting and Welding	DC	5	45	0	30	45	120	4
3		Micro and Nano Manufacturing	DC	3	45	0	0	45	90	3
4		Additive Manufacturing	MC	5	45	0	30	45	120	4
5		Elective 1	MC	5	45	0	30	45	120	4
6		Research Methodology / IPR/Operations Research	OE	2	30	0	0	30	60	2
PRACTICALS										
7		Industrial Modelling and Simulation Laboratory	SEC	3	0	15	45	20	80	2
TOTAL				27	255	45	135	275	710	23

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW& SL	TH	C
1		Data Analytics and AI in Manufacturing	MD	4	30	0	30	30	90	3
2		Materials Testing and Characterization Techniques	DC	3	45	0	0	45	90	3
3		Robotics: System Design	MC	5	45	0	30	45	120	4
4		Bio Inspired Robotics	MC	5	45	0	30	45	120	4
5		Elective 2	MC	3	45	0	0	45	90	3
6		Elective 3	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Welding Automation and Robotics Laboratory	SEC	3	0	15	45	20	80	2
TOTAL				26	255	15	135	275	680	22

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Multi-disciplinary Open Elective	MD	3	45	0	0	45	90	3
2		Elective - 4	MC	5	45	0	30	45	120	4
3		Elective - 5	MC	5	45	0	30	45	120	4
PRACTICALS										
4		Project/Dissertation Phase I	PD	16	0	0	120	180	300	8
5		Research Internship	RI		0	0	0	320	320	4
TOTAL				29	135	0	180	635	950	23

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
PRACTICALS										
1		Project/Dissertation Phase II	PD	24	0	0	180	270	450	12
TOTAL				24	0	0	24	270	450	12

ELECTIVE 1

Basket 1: Automation and Digital Manufacturing

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW& SL	TH	C
1		IoT in Manufacturing	MC	5	45	0	30	45	120	4
2		Material Handling and Warehouse Automation	MC	5	45	0	30	45	120	4
3		Agricultural Automation and Robots	MC	5	45	0	30	45	120	4
4		Immersive Technologies in Automation	MC	5	45	0	30	45	120	4
5		Sensors, Actuators, and Controllers for Automation	MC	5	45	0	30	45	120	4

ELECTIVE 2

Basket 2: Industrial Management

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW& SL	TH	C
1		Lean and Six Sigma	MC	3	45	0	0	45	90	3
2		Enterprise Resource Planning	MC	3	45	0	0	45	90	3
3		Production Planning and Manufacturing Management	MC	3	45	0	0	45	90	3
4		Supply Chain and Project Management	MC	3	45	0	0	45	90	3
5		Sustainable Manufacturing and Green Operations	MC	3	45	0	0	45	90	3

ELECTIVE 3

Basket 3: Machine Tool and Metrology

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Theory of Metal Cutting	MC	3	45	0	0	45	90	3
2		Advanced Tool Engineering	MC	3	45	0	0	45	90	3
3		Precision Engineering and Metrology	MC	3	45	0	0	45	90	3
4		Prognostics and Condition Monitoring of Machine Tools	MC	3	45	0	0	45	90	3
5		Non-Destructive Testing and Evaluation	MC	3	45	0	0	45	90	3

ELECTIVE 4

Basket 4: Design and Optimization

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Computer Aided Product Design and Lifecycle Management	MC	5	45	0	30	45	120	4
2		Design for Manufacture, Assembly and Environment	MC	5	45	0	30	45	120	4
3		Design Thinking Based New Product Innovation	MC	5	45	0	30	45	120	4
4		Engineering Failure Analysis in Design	MC	5	45	0	30	45	120	4
5		Design of Experiments and Response Surface Methodology	MC	5	45	0	30	45	120	4

ELECTIVE 5
Basket 5: Materials

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Composite Materials and Applications	MC	5	45	0	30	45	120	4
2		Lasers in Materials Processing	MC	5	45	0	30	45	120	4
3		Advanced Engineering Materials	MC	5	45	0	30	45	120	4
4		Smart Materials and Structures	MC	5	45	0	30	45	120	4
5		Mechanical Behavior of Materials	MC	5	45	0	30	45	120	4

MULTI-DISCIPLINARY OPEN ELECTIVE

CHENNAI

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Business Analytics	MD	3	45	0	0	45	90	3
2		Industrial Safety	MD	3	45	0	0	45	90	3
3		Operations Research	MD	3	45	0	0	45	90	3
4		Cost Management of Engineering Projects	MD	3	45	0	0	45	90	3
5		Composite Materials	MD	3	45	0	0	45	90	3
6		Waste to Energy	MD	3	45	0	0	45	90	3

Note: Students from M.Tech. Manufacturing Engineering and Automation must not opt for this Open Elective.

L - Lecture, T - Tutorial, P - Practical, TW & SL – Term Work & Self Learning, TH – Total Hours and C – Credits

SHIV NADAR
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CHENNAI