SHIV NADAR UNIVERSITY
CHENNAI

SSN School of Engineering

DEPARTMENT OF MECHANICAL ENGINEERING

Bachelor of Technology
Mechanical Engineering

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)

PEO1: Graduates will excel as mechanical engineers in industries and research organizations leading to successful professional career or entrepreneurship.

PEO2: Graduates will pursue higher studies, research, professional development and lifelong learning to keep abreast with current technological advancements.

PEO3: Graduates will 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:

PO	Graduate Attribute	Programme Outcome
1	Engineering Knowledge	Apply the knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization to develop to the solution of complex Mechanical Engineering problems (WK 1 to 4).
2	Problem Analysis	Identify, formulate, review research literature, and analyze complex

		Mechanical Engineering problems reaching substantiated conclusions with consideration for sustained development (WK 1 to 4).
3	Design/Development of solutions	Design creative solutions for complex Mechanical Engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
4	Conduct Investigations of Complex Problems	Conduct investigations of complex Mechanical Engineering problems using research-based knowledge including design of experiments, modelling, analysis and interpretation of data to provide valid conclusions (WK8).
5	Engineering Tool Usage:	Create, select, and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling, recognizing their limitations to solve complex Mechanical Engineering problems (WK2 and WK6).
6	The Engineer and The World	Analyze and evaluate societal and environmental aspects while solving complex Mechanical Engineering problems for their impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5 and WK7).
7	Ethics	Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws (WK9).
8	Individual and Collaborative Teamwork.	Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9	Communication	Communicate effectively and inclusively within the engineering community and the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.

10	Project Management and Finance	Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multi-disciplinary environments.
11	Life-long learning	Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8).

PROGRAM SPECIFIC OBJECTIVES (PSOs)

PSO1	Graduates will be able to exhibit competence in modern manufacturing processes, automation, robotics and quality control for efficient and sustainable production in industries
PSO2	Graduates will be able to design and analyse mechanical engineering components and systems using principles of engineering mechanics and design, material science and computational methods.
PSO3	Graduates will be able to analyse and apply engineering concepts of thermodynamics, fluid mechanics and heat transfer in thermal and fluid systems applications.

PEO - PO/PSO Mapping

PEO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
PEO1	3	3	3	3	2	2	2	3	3	3	3	3	3	3
PEO2	3	3	3	3	3	2	2	3	3	3	3	3	3	3
PEO3	3	3	3	3	2	2	2	3	3	3	3	3	3	3

Mapping Programme Outcomes with Graduate Attributes

Programme Outcomes		NBA's GAs
PO1:	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop the solution of complex engineering problems.	**GA1**
PO2:	**Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4).	**GA2**
PO3:	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/ processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society, and environment as required. (WK5).	**GA3**
PO4:	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).	**GA4**
PO5:	**Engineering Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).	**GA5**
PO6:	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture, and environment. (WK1, WK5, and WK7).	**GA10**
PO7:	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; adhere to national & international laws. (WK9).	**GA10**
PO8:	**Individual and Collaborative Teamwork:** Function effectively as an	**GA6**

	individual, and as a member or leader in diverse/multi-disciplinary teams	
PO9:	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.	**GA8**
PO10:	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.	**GA7**
PO11:	**Life-Long Learning:** Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8).	**GA9, G11**

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	Major Core (MC)	80
2	Minor Stream (MS)	32
3	Multidisciplinary (MD)	09
4	Ability Enhancement Course (AEC)	08
5	Skill Enhancement Course (SEC)	09
6	Value Added Courses (VAC)	08
7	Summer Internship (SI)	2
8	Project Dissertation (PD)	12
	Total	160

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

Semester\Category	MC	MS	MD	AEC	SEC	VAC	SI	PD	TOTAL
1	6		6	3	2	4			**21**
2	11		3	3	2	2			**21**
3	12	5			4				**21**
4	17	2			1	1			**21**
5	14	6				1			**21**
6	13	6						4	**23**
7	7	8		2			2	6	**25**
8		5						2	**7**
Total	**80**	**32**	**9**	**8**	**9**	**8**	**2**	**12**	**160**

Credit Breakup of Proposed Curriculum across Course Categories - Detailed

Semester	MC			MS			MD	AEC	SEC	VAC	SI	PD	TOTAL
	SSNSoE	*Dept Major*	*Program Major*	*SSNSoE*	*Dept Minor*	*Program Minor*	*SSNSoE*	*SSNSoE*	*Dept / Program*	*Dept / Program*	*Dept / Program*	*Dept / Program*	
1		6					6	3	2	4			21
2	3	8					3	3	2	2			21
3		12		3	2				4				21
4		14	3		2				1	1			21
5			14		6					1			21
6			13			6						4	23
7			7			8		2			2	6	25
8						5						2	7
Total	3	40	37	3	10	19	9	8	9	8	2	12	160

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics I	MD	3	30	15	0	45	90	3
2		Engineering Chemistry	MD	4	30	0	30	30	90	3
3		Communicative English	AEC	4	30	0	30	30	90	3
4		Engineering Graphics	MC	3	30	0	15	45	90	3
5		Engineering Mechanics	MC	3	45	0	0	45	90	3
6		Professional Ethics and Human Values	VAC	2	30	0	0	30	60	2
7		Programming in Python for Data Science	VAC	3	15	0	15	30	60	2
PRACTICALS										
8		Makers Space Laboratory	SEC	4	0	0	30	30	60	2
TOTAL				**26**	**210**	**15**	**120**	**285**	**630**	**21**

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics II	MC	3	30	15	0	45	90	3
2		English for Engineers	AEC	4	30	0	15	45	90	3
3		Engineering Physics	MD	4	30	0	30	30	90	3
4		Environmental Engineering	VAC	2	30	0	0	30	60	2
5		Manufacturing Processes I	MC	5	45	0	30	45	120	4
6		Fundamentals of Mechanical Engineering and Practices	MC	5	30	0	45	45	120	4
PRACTICALS										
7		Skill Enhancement Laboratory (Drone workshop)	SEC	4	0	0	30	30	60	2
TOTAL				**27**	**195**	**15**	**150**	**270**	**630**	**21**

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics III	MS	3	30	15	0	45	90	3
2		Fluid Mechanics and Machinery	MC	3	45	0	0	45	90	3
3		Material Science and Engineering	MS	2	30	0	0	30	60	2
4		Mechanics of Solids	MC	3	45	0	0	45	90	3
5		Design Thinking, Innovation and Entrepreneurship	SEC	3	30	0	15	45	90	3
6		Engineering Thermodynamics	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Mechanics of Solids Laboratory	MC	3	0	0	45	15	60	1.5
8		Fluid Mechanics Laboratory	MC	3	0	0	45	15	60	1.5
9		Material Science Laboratory	SEC	2	0	0	30	15	45	1
TOTAL				**25**	**225**	**15**	**135**	**300**	**675**	**21**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Manufacturing Processes II	MC	5	45	0	30	45	120	4
2		Computer Aided Design and Manufacturing	MC	4	30	0	30	30	90	3
3		Thermal Engineering	MC	5	45	0	30	45	120	4
4		Kinematics of Machinery	MC	3	45	0	0	45	90	3
5		Industry 4.0	MS	2	30	0	0	30	60	2
6		Metrology and Measurements	MC	3	30	0	15	45	90	3
PRACTICALS										
7		Engine Assembling Workshop	SEC	2	0	0	30	15	45	1

8		Independent Research / Extra Academic Activity	VAC	2	0	0	30	15	45	1
TOTAL				**26**	**225**	**0**	**165**	**270**	**660**	**21**

SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Dynamics of Machines	MC	5	45	0	30	45	120	4
2		Mechatronics and Automation	MC	4	30	0	30	30	90	3
3		Fundamentals of Heat Transfer	MC	5	45	0	30	45	120	4
4		Design of Machine Elements	MC	3	45	0	0	45	90	3
5		Fundamentals of 3D Printing Techniques	MS	3	45	0	0	45	90	3
6		Introduction to AI and ML	MS	3	45	0	0	45	90	3
PRACTICALS										
7		Independent Research / Extra Academic Activity	VAC	2	0	0	30	15	45	1
TOTAL				**25**	**255**	**0**	**120**	**270**	**645**	**21**

Note: Students Pursuing GPP should register for an additional course on Project Management and Planning (3 credits) under MS category during V semester and this additional credit earned will be adjusted during VIII semester by exempting a minor course of 3 credits.

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Design of Mechanical Drives	MC	3	45	0	0	45	90	3
2		Finite Element Analysis and Simulation	MC	5	45	0	30	45	120	4
3		Robot Technology	MC	5	45	0	30	45	120	4
4		Automobile Engineering	MC	2	30	0	0	30	60	2
5		Lasers in Materials and	MS	3	45	0	0	45	90	3

		Manufacturing								
6		Total Quality Management	MS	3	45	0	0	45	90	3
PRACTICALS										
7		Capstone Project Phase 1	PD	6	0	0	60	90	150	4
TOTAL				**27**	**255**	**0**	**120**	**345**	**720**	**23**

SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Industrial Practices	MC	5	45	0	30	45	120	4
2		Optimization Techniques	MC	3	45	0	0	45	90	3
3		Program minor 3	MS	3	45	0	0	45	90	3
4		Program Minor 4	MS	3	45	0	0	45	90	3
5		Program Minor 5	MS	2	30	0	0	30	60	2
6		Ability Enhancement Course (Technical and Soft skills)	AEC	2	30	0	0	30	60	2
PRACTICALS										
7		Capstone Project Phase 2	PD	9	0	0	90	135	225	6
8		Internship	SI	4	0	0	0	160	160	2
TOTAL				**31**	**240**	**0**	**120**	**535**	**895**	**25**

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Program Minor - 6	MS	2	30	0	0	30	60	2
2		Program Minor -7	MS	3	45	0	0	45	90	3
PRACTICALS										

3		Capstone Project Phase 3	PD	3	0	0	30	45	75	2
TOTAL				**8**	**75**	**0**	**30**	**120**	**225**	**7**

Major Core Courses

Department Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Engineering Graphics	1	3	30	0	15	45	90	3
2		Engineering Mechanics	1	3	45	0	0	45	90	3
3		Manufacturing Processes I	2	5	45	0	30	45	120	4
4		Fundamentals of Mechanical Engineering and Practices	2	5	30	0	45	45	120	4
5		Fluid Mechanics and Machinery	3	3	45	0	0	45	90	3
6		Mechanics of Solids,	3	3	45	0	0	45	90	3
7		Engineering Thermodynamics	3	3	45	0	0	45	90	3
		Fluid Mechanics Laboratory	3	3	0	0	45	15	60	1.5
9		Mechanics of Solids Laboratory	3	3	0	0	45	15	60	1.5
10		Manufacturing Processes II	4	5	5	5	5	5	5	4
11		Computer Applications in Design	4	45	45	45	45	45	45	3
12		Thermal Engineering	4	0	0	0	0	0	0	4
13		Kinematics of Machinery	4	30	30	30	30	30	30	3

Programme Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Metrology and Measurements	4	3	30	0	15	45	90	3
2		Dynamics of Machines and Laboratory	5	5	45	0	30	45	120	4
3		Mechatronics and Automation	5	4	30	0	30	30	90	3
4		Fundamentals of Heat Transfer	5	5	45	0	30	45	120	4
5		Design of Machine Elements	5	3	45	0	0	45	90	3
6		Design of Mechanical Drives	6	3	45	0	0	45	90	3

7		Finite Element Analysis and Simulation	6	5	45	0	30	45	120	4
8		Robot Technology	6	5	45	0	30	45	120	4
9		Automobile Engineering	6	2	30	0	0	30	60	2
10		Industrial Practices	7	5	45	0	30	45	120	4
11		Optimization Techniques	7	3	45	0	0	45	90	3

Department Minor Stream Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics III	3	3	3	3	3	3	3	3
2		Material Science and Engineering	3	2	30	0	0	30	60	2
3		Industry 4.0	4	2	30	0	0	30	60	2
4		Fundamentals of 3D Printing Techniques	5	3	45	0	0	45	90	3
5		Introduction to AI and ML	5	3	45	0	0	45	90	3

MINOR STREAMS

The Department of Mechanical Engineering offers the following list of Minor Streams.

1. Robotics and Automation Engineering
2. Industrial Design and Manufacturing

Each Minor Stream has seven courses worth 19 credits. The student must enroll in any one of the above Two Streams.

MINOR STREAM 1 - Robotics and Automation Engineering

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Analytical Robotics	6	3	45	0	0	45	90	3
2		Machine Vision	6	3	45	0	0	45	90	3
3		Mobile Robots	7	3	45	0	0	45	90	3
4		Minor Stream Basket 1	7	3	45	0	0	45	90	3
5		Minor Stream Basket 2	7	2	30	0	0	30	60	2
6		Minor Stream Basket 3	8	2	30	0	0	30	60	2
7		Minor Stream Basket 4	8	3	45	0	0	45	90	3

Basket 1	Basket 2	Basket 3	Basket 4
Credit -3	**Credit - 2**	**Credit - 2**	**Credit – 3**
Collaborative Robots	Robot Operating System	Bio-inspired Robots	Adaptive Control for Robots
Assistive and Therapeutic devices	Immersive Technologies for manufacturing	Human Robot Interface	Bio-Mechatronics
Feld and Service Robots	Drone Technologies	Robot Programming and Simulation	Micro sensors, Micro actuators and Control
Material Handling and Warehouse Automation	Agricultural Automation	Intelligent Agents for Products	Lean Manufacturing

MINOR STREAM 2 - Industrial Design and Manufacturing

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Lasers in Materials and Manufacturing	6	3	45	0	0	45	90	3
2		Total Quality Management	6	3	45	0	0	45	90	3
3		Electric vehicle	7	3	45	0	0	45	90	3

4		Minor Stream Basket 1	7	3	45	0	0	45	90	3
5		Minor Stream Basket 2	7	2	30	0	0	30	60	2
6		Minor Stream Basket 3	8	2	30	0	0	30	60	2
7		Minor Stream Basket 4	8	3	45	0	0	45	90	3

Basket 1	**Basket 2**	**Basket 3**	**Basket 4**
Credit -3	**Credit - 2**	**Credit - 2**	**Credit – 3**
Design Concepts in Engineering	Computer Integrated Manufacturing Systems	Design of Robotic System	Power Plant Engineering
Product Design and Development	Reliability Engineering	Robot Operating System for field and service robots	Renewable Sources of Energy
Noise and Vibration Control	Unconventional Machining Processes	IoT for Mechatronics	Gas Dynamics and Jet Propulsion
Geometric Dimensioning and Tolerancing	Design for Manufacturing	Intelligent Automation in Manufacturing	Hydrogen and Fuel Cells

Multi-Disciplinary Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics I	1	3	30	15	0	45	90	3
2		Engineering Physics	1	4	30	0	30	30	90	3
3		Engineering Chemistry	1	4	30	0	30	30	90	3

Skill Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW& SL	TH	C
1		Drone Laboratory	1	4	0	0	30	30	60	2
2		Makers Space Laboratory – EPL	2	4	0	0	45	45	90	2

3		Design Thinking, Innovation and Entrepreneurship	3	3	30	0	15	45	90	3
4		Material Science Laboratory	3	2	0	0	30	15	45	1
5		Engine Assembling Workshop	4	2	0	0	30	15	45	1

Ability Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Communicative English	1	4	30	0	30	30	90	3
2		English for Engineers	2	4	30	0	15	45	90	3
3		Ability Enhancement Course Basket – Technical and Soft skills	7	2	30	0	0	30	60	2

Value Added Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Professional Ethics and Human Values	1	2	30	0	0	30	60	2
2		Programming in Python for Data Science	1	3	15	0	15	30	60	2
3		Environmental Engineering	2	2	30	0	0	30	60	2
4		Independent Research / Extra Academic Activity	4	2	0	0	30	15	45	1
5		Independent Research / Extra Academic Activitiy	5	2	0	0	30	15	45	1

Micro-Specialization

The Department offers Micro-Specializations to Undergraduate students. Its salient features are as follows:

1. Each Micro-Specialization has a defined structure in terms of three sequential components:
    - **Component I** - One Foundation course that constitutes a mandatory requirement and also a prerequisite for subsequent components.
    - **Component II** - Two courses from a specified vertical.
    - **Component III** - Project/Design/Term Paper
2. A Student would be required to complete all three components (12-14 credits) from the specified stream to earn a Micro-Specialization.

Provisional List of Micro-Specialization Verticals

The following is the list of Micro-Specialization verticals offered to our undergraduate students:

1. Industrial Design
2. Thermal and Energy Systems
3. Smart Materials and Manufacturing
4. Industrial Engineering and Mechatronics

GRAND PROJECT PATHWAY

Semester	Course	Credit
III	Design Thinking, Innovation and Entrepreneurship	3
IV	Independent Research /Extra Academic Activity	1
V	Independent Research /Extra Academic Activity	1
V	Project Management and Planning	3
VI	Capstone Project Phase 1	4
VII	Capstone Project Phase 2	6
VIII	Capstone Project Phase 3	2
	Total Credit for GPP	**20**

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