

ACADEMIC CURRICULA
UNDERGRADUATE/ INTEGRATED
POST GRADUATE DEGREE
PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 1

(Revised on July 2024)



SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

55. Integrated M.Tech. in Mechanical Engineering

55. (a) Mission of the Department

Mission Stmt – 1	<i>To impart quality education to produce eminent mechanical engineers</i>
Mission Stmt – 2	<i>To establish Centers of Research Excellence to inculcate research acumen to faculty and students on the emerging thrust areas of mechanical engineering.</i>
Mission Stmt – 3	<i>To inculcate progressive education and intricate facts through cognitive training programs to the faculty and students using state-of-art facilities.</i>

55. (b) Program Educational Objectives (PEO)

PEO – 1	<i>Practice mechanical engineering in different disciplines towards system design, realization, and manufacturing</i>
PEO – 2	<i>Enhance professional practice to meet the global standards with ethical and social responsibility.</i>
PEO – 3	<i>Manufacturing the components with state-of-art techniques to solve industrial, social and environmental problems</i>
PEO – 4	<i>Progress in multi-disciplinary skills and transcend in leadership qualities</i>

55. (c) Mission of the Department to Program Educational Objectives (PEO) Mapping

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3
PEO - 1	3	3	3
PEO - 2	2	2	3
PEO - 3	3	3	3
PEO - 4	2	3	3

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

55. (d) Mapping Program Educational Objectives (PEO) to Program Outcomes (PO)

	Program Outcomes (PO)												Program Specific Outcomes (PSO)		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO-1	PSO-2	PSO-3
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning			
PEO - 1	3	3	2	3	3	-	-	-	-	-	-	-	3	3	-
PEO - 2	-	-	3	-	-	3	3	3	-	-	-	3	-	-	-
PEO - 3	3	3	-	-	3	3	3	-	-	-	2	3	1	3	-
PEO - 4	-	3	3	2	3	-	-	-	3	3	3	3	3	-	-

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

PSO – Program Specific Outcomes (PSO)

PSO - 1	<i>Apply contemporary technologies for sustainable development in mechanical engineering systems</i>
PSO - 2	<i>Ability to adopt the state-of-art technology in manufacturing</i>

55. (e) Program Structure: Integrated M.Tech. in Mechanical Engineering

Humanities & Social Sciences including Management Courses (H)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21LEH101T	Communicative English	2	1	0	3
21LEH102T	Chinese	2	1	0	3
21LEH103T	French				
21LEH104T	German				
21LEH105T	Japanese				
21LEH106T	Korean				
21LEH107T	Spanish				
21LEH108T	Russian				
21GNH101J	Philosophy of Engineering	1	0	2	2
21PDH209T ¹	Social Engineering	2	0	0	2
21GNH401T	Behavioral Psychology	2	1	0	3
Total Credits 13					
Engineering Science Courses (S)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21CSS101J	Programming for Problem Solving	3	0	2	4
21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2
21MES102L ¹	Engineering Graphics and Design	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21MES101T	Engineering Mechanics	3	1	0	4
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3
21CSS303T	Data Science	2	0	0	2
Total Credits 21					
Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21GNP301L ¹	Community Connect	0	0	2	1
21MEP302L ¹	Project	0	0	6	3
21MEP303T ¹	MOOC	3	0	0	
21MEP401L	Major Project	0	0	30	15
21MEP402L	Major Project	0	0	20	10
21MEP403L	Internship#	0	0	10	5
21MEP501L	Specialization Project	0	0	40	20
21MEP502L	Specialization Project	0	0	30	15
21MEP503L	Domain Internship	0	0	10	5
Total Credits 39					
Open Elective Courses (O) (Any 4 Course)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MEO101T	Fundamentals of Composite Materials	3	0	0	3
21MEO102T	Reverse Engineering and 3D Printing	3	0	0	3
21MEO103T	Fundamentals of Biomechanics	3	0	0	3
21MEO104T	TQM and Reliability Engineering	3	0	0	3
21MEO105T	Occupational Safety and Disaster Management	3	0	0	3
21MEO106T	Introduction to Robotics	3	0	0	3
21MEO107T	Fundamentals of Nano Engineering	3	0	0	3
21MEO108T	Computer Numerical Control Programming and Operation	3	0	0	3
Basic Science Courses (B)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MAB101T	Calculus and Linear Algebra	3	1	0	4
21CYB101J	Chemistry	3	1	2	5
21BTB103T	Biology	2	0	0	2
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4
21MAB202T	Numerical Methods	3	1	0	4
21MAB301T	Probability and Statistics	3	1	0	4
Total Credits 32					
Professional Core Courses (C)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MEC201T	Engineering Thermodynamics	3	0	0	3
21MEC202T ²	Mechanics of Solids	3	1	0	4
21MEC203T	Engineering Materials and Metallurgy	3	0	0	3
21MEC204T	Manufacturing Processes and Metrology	3	0	0	3
21MEC201L ¹	Manufacturing Processes and Metrology Laboratory	0	0	2	1
21MEC202L ¹	Material Testing Laboratory	0	0	2	1
21CSC206T	Artificial Intelligence	3	0	0	3
21MEC205T ²	Fluid Mechanics and Machinery	3	0	0	3
21MEC206T	Kinematics and Dynamics of Machines	3	0	0	3
21MEC203L ¹	Machine Dynamics Laboratory	0	0	2	1
21MEC204L ¹	Fluid Dynamics Laboratory	0	0	2	1
21MEC205L ¹	Mechanical Modeling and Assembly	0	0	4	2
21MEC301T	Thermal Systems Engineering	3	1	0	4
21MEC301P ¹	Design of Mechanical Systems	3	0	0	3
21MEC302T ²	Sensors and Control Systems	3	0	0	3
21MEC301L ¹	Thermal Power Systems Laboratory	0	0	2	1
21MEC302L ¹	Automation and Control Systems Laboratory	0	0	2	1
21MEC301J	Heat and Mass Transfer	3	0	2	4
21MEC302J ²	Finite Element Methods	3	0	2	4
21MEC303T	Industry 4.0	3	0	0	3
21MEC561J	Cyber Physical Systems and Industrial Internet of Things	3	0	2	4
21MEC562J	Additive Manufacturing	2	1	2	4
21IPC501J ²	Research Methodology	2	1	2	4
Total Credits 63					
Open Elective Courses (O)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MEO109T	Resource Management Techniques	3	0	0	3
21MEO110T	Energy Systems for Sustainable Buildings	3	0	0	3
21MEO111T	Environmental Pollution and Abatement	3	0	0	3
21MEO112T	Renewable Energy Sources and Application	3	0	0	3
21MEO113J	Electronics Thermal Management	2	0	2	3
21MEO114T	Solar Energy for Societal Applications	3	0	0	3
21MEO115T	Introduction to Drones	3	0	0	3
Total Credits 12					

Professional Elective Courses (E) (Any 10 Courses)						Professional Elective Courses (E)					
Course Code	Course Title	Hours / Week			C	Course Code	Course Title	Hours / Week			C
		L	T	P				L	T	P	
21MEE101T	Computer Aided Design- Computer Aided Manufacturing	3	0	0	3	21MEE308T	Sustainable Waste Management	3	0	0	3
21MEE102T	Composite Materials and Characterization	3	0	0	3	21MEE561T	Smart Manufacturing	3	0	0	3
21MEE103T	Automation in Manufacturing Systems	3	0	0	3	21MEE562T	Industrial Automation	3	0	0	3
21MEE104T	Energy Engineering and Management	3	0	0	3	21MEE563T	Embedded System Design for Manufacturing	3	0	0	3
21MEE105T	Solar Energy Systems	3	0	0	3	21MEE564T	AI and Expert Systems for Manufacturing	3	0	0	3
21MEE201T	Foundation Skills in *Integrated Product Development	3	0	0	3	21MEE565T	Machine Learning for Manufacturing	3	0	0	3
21MEE202T	Mechanical Vibrations	3	0	0	3	21MEE566T	Computer Aided Metrology	3	0	0	3
21MEE203T	Industrial Tribology	3	0	0	3	21MEE567T	Sensors for Intelligent Manufacturing and Condition Monitoring	3	0	0	3
21MEE204T	Design for Manufacturing and Assembly	3	0	0	3	21MEE568T	Smart Operations Management	3	0	0	3
21MEE205T	Electric Vehicle Technology	3	0	0	3	21MEE569T	Micro Fabrication and Machining Techniques	3	0	0	3
21MEE206T	Biomechanics	3	0	0	3	21MEE629J	Augmented Reality and Virtual Reality	2	0	2	3
21MEE207T	Operations Research	3	0	0	3	21MEE661T	Robotics and Autonomous Systems	3	0	0	3
21MEE208T	Soft Computing Techniques and Applications in Mechanical Engineering	3	0	0	3	Total Credits					30
21MEE209T	Process Planning and Cost Estimation	3	0	0	3	Non Credit Courses (M)					
21MEE210T	Mechatronics System Design	3	0	0	3	Course Code	Course Title	Hours / Week			C
21MEE211T	Soft Robotics	3	0	0	3			L	T	P	
21MEE212T	Heating, Ventilation and Air Conditioning Systems	3	0	0	3	21PDM101L ¹	Professional Skills and Practices	0	0	2	0
21MEE213T	Emerging Technologies in Automotive Systems	3	0	0	3	21PDM102L ¹	General Aptitude	0	0	2	
21MEE214T	Gas Dynamics and Space Propulsion	3	0	0	3	21PDM201L ¹	Verbal Reasoning	0	0	2	
21MEE215T	Computational Fluid Dynamics: Theory with Applications	3	0	0	3	21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2	
21MEE216T	Modeling and Analysis of Thermal Systems	2	1	0	3	21PDM301L ¹	Analytical and Logical Thinking Skills	0	0	2	
21MEE217J	Microelectronics Thermal Management.	2	0	2	3	21PDM302L ¹	Employability Skills and Practices	0	0	2	0
21MEE218T	Aerodynamics of Electric and Sports Vehicles	3	0	0	3	21CYM101T ¹	Environmental Science	1	0	0	
21MEE219T	Green Energy Systems	3	0	0	3	21LEM101T ¹	Constitution of India	1	0	0	
21MEE301T	Optimization in Engineering Design	3	0	0	3	21LEM102T ¹	Universal Human Values – Introduction	1	0	0	
21MEE302T	Design of transmission Systems	3	0	0	3	21LEM201T ¹	Professional Ethics	1	0	0	0
21MEE303T	Micro and Nano Machining	3	0	0	3	21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	
21MEE304T	Machine Vision	3	0	0	3	21LEM301T ¹	Indian Art Form	1	0	0	
21MEE305T	Quality Management Systems	3	0	0	3	21LEM302T ¹	Indian Traditional Knowledge	1	0	0	
21MEE306T	Energy Conversion Systems	3	0	0	3	21GNM101L ¹	Physical and Mental Health using Yoga	0	0	2	0
21MEE307T	Sustainable and Renewable Energy Systems	3	0	0	3	21GNM102L ¹	National Service Scheme				
						21GNM103L ¹	National Cadet Corps				
						21GNM104L ¹	National Sports Organization				
Total Credits						Total Credits					03

55. (f) Implementation Plan: Integrated M.Tech. in Mechanical Engineering

Semester - I						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21LEH101T	Communicative English	2	1	0	3	
21MAB101T	Calculus and Linear Algebra	3	1	0	4	
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5	
21MES102L ¹	Engineering Graphics and Design	0	0	4	2	
21EES101T	Electrical and Electronics Engineering	3	1	0	4	
21CYM101T ¹	Environmental Science	1	0	0	0	
21PDM101L ¹	Professional Skills and Practices	0	0	2	0	
21LEM101T ¹	Constitution of India	1	0	0	0	
Total Credits					18	

Semester - II						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21LEH102T	Chinese	2	1	0	3	
21LEH103T	French					
21LEH104T	German					
21LEH105T	Japanese					
21LEH106T	Korean					
21LEH107T	Spanish					
21LEH108T	Russian					
21GNH101J	Philosophy of Engineering	1	0	2	2	
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4	
21CYB101J	Chemistry	3	1	2	5	
21MES101T	Engineering Mechanics	3	1	0	4	
21CSS101J	Programming for Problem Solving	3	0	2	4	
21BTB103T	Biology	2	0	0	2	
21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2	
21PDM102L ¹	General Aptitude	0	0	2	0	
21GNM101L ¹	Physical and Mental Health using Yoga	0	0	2	0	
21GNM102L ¹	National Service Scheme					
21GNM103L ¹	National Cadet Corps					
21GNM104L ¹	National Sports Organization					
Total Credits					26	

Semester - III						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4	
21MEC201T	Engineering Thermodynamics	3	0	0	3	
21MEC202T ²	Mechanics of Solids	3	1	0	4	
21MEC203T	Engineering Materials and Metallurgy	3	0	0	3	
21MEC204T	Manufacturing Processes and Metrology	3	0	0	3	
21MEC201L ¹	Manufacturing Processes and Metrology Laboratory	0	0	2	1	
21MEC202L ¹	Material Testing Laboratory	0	0	2	1	
21PDH209T ¹	Social Engineering	2	0	0	2	
21LEM201T ¹	Professional Ethics	1	0	0	0	
21PDM201L ¹	Verbal Reasoning	0	0	2	0	
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3	
Total Credits					24	

Semester - IV						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21MAB202T	Numerical Methods	3	1	0	4	
21CSC206T	Artificial Intelligence	2	1	0	3	
21MEC205T ²	Fluid Mechanics and Machinery	3	0	0	3	
21MEC206T	Kinematics and Dynamics of Machines	3	0	0	3	
	Professional Elective - I				3	
21MEC203L ¹	Machine Dynamics Laboratory	0	0	2	1	
21MEC204L ¹	Fluid Dynamics Laboratory	0	0	2	1	
21MEC205L ¹	Mechanical Modeling and Assembly	0	0	4	2	
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3	
21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2	0	
Total Credits					23	

Semester - V						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21MAB301T	Probability and Statistics	3	1	0	4	
21MEC301T	Thermal Systems Engineering	3	1	0	4	
21MEC301P ¹	Design of Mechanical Systems	3	0	0	3	
21MEC302T ²	Sensors and Control Systems	3	0	0	3	
	Professional Elective - II				3	
	Open Elective - I				3	
21MEC301L ¹	Thermal Power Systems Laboratory	0	0	2	1	
21MEC302L ¹	Automation and Control Systems Laboratory	0	0	2	1	
21PDM301L ¹	Analytical and Logical Thinking Skills	0	0	2	0	
21LEM301T ¹	Indian Art Form	1	0	0	0	
21GNP301L ¹	Community Connect	0	0	2	1	
Total Credits					23	

Semester - VI						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21CSS303T	Data Science	2	0	0	2	
21MEC301J	Heat and Mass Transfer	3	0	2	4	
21MEC302J ²	Finite Element Methods	3	0	2	4	
21MEC303T	Industry 4.0	3	0	0	3	
	Professional Elective - III				3	
21MEP302L ¹	Project	0	0	6	3	
21MEP303T ¹	MOOC	3	0	0		
	Open Elective - II				3	
21PDM302L ¹	Employability Skills and Practices	0	0	2	0	
21LEM302T ¹	Indian Traditional Knowledge	1	0	0	0	
Total Credits					22	

Semester - VII						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21GNH401T	Behavioral Psychology	2	1	0	3	
	Professional Elective - IV				3	
	Professional Elective - V				3	
O	Open Elective - III				3	
Total Credits					12	

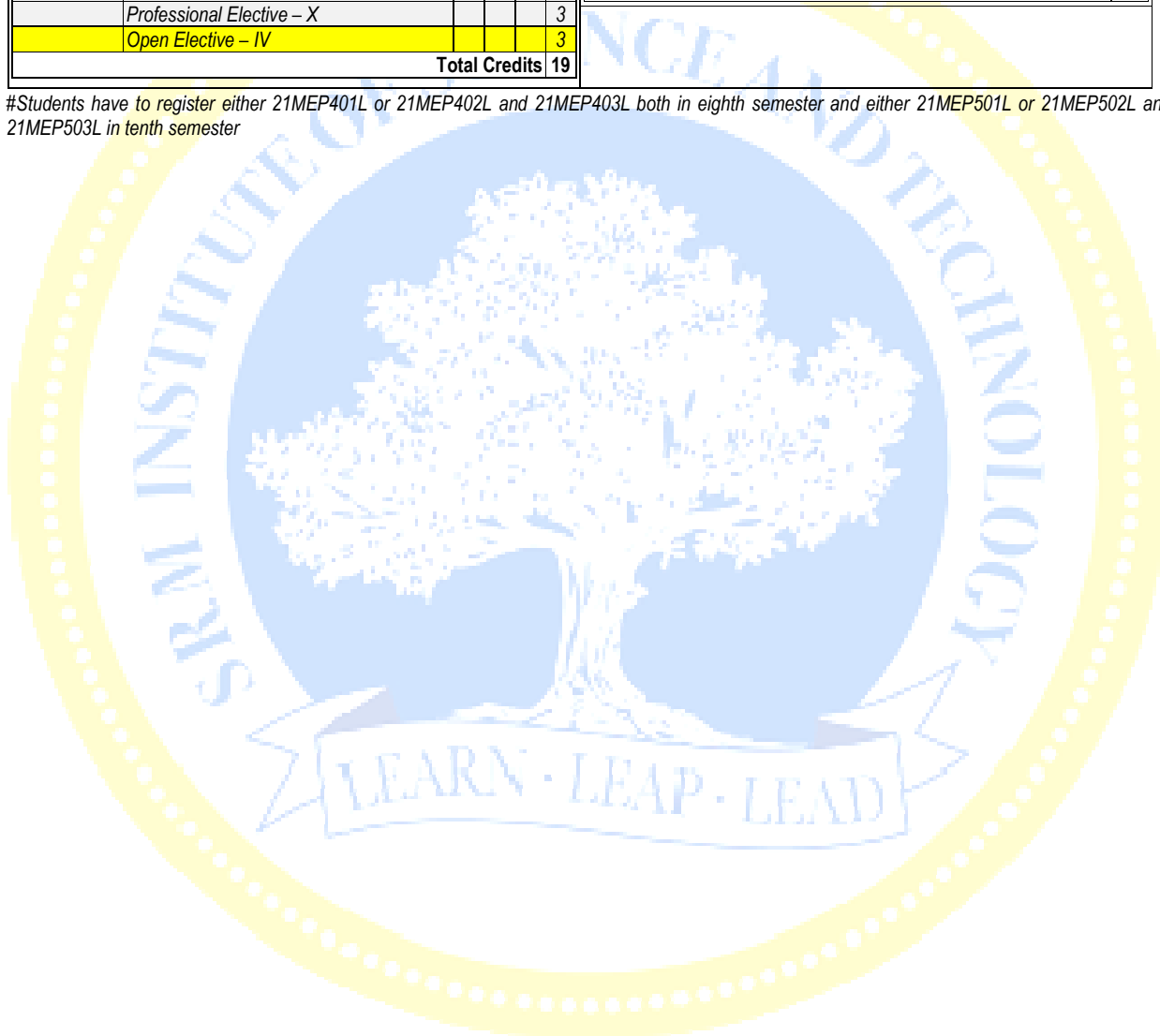
Semester - VIII						
Course Code	Course Title	Hours / Week				
		L	T	P	C	

				21MEC551J	Cyber Physical Systems and Industrial Internet of Things	3	0	2	4	
					Professional Elective - VI				3	
				21IPC501JR	Research Methodology	2	1	2	4	
				21MEP401L	Major Project	0	0	30	15	
				21MEP402L	Major Project	0	0	20	10	
				21MEP403L	Internship	0	0	10	5	
				Total Credits						26

Semester - IX						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21MEC552J	Additive Manufacturing	2	1	2	4	
	Professional Elective - VII				3	
	Professional Elective – VIII				3	
	Professional Elective – IX				3	
	Professional Elective – X				3	
	Open Elective – IV				3	
Total Credits					19	

Semester - X						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21MEP501L	Specialization Project	0	0	40	20	
21MEP502L	Specialization Project	0	0	30	15	
21MEP503L	Domain Internship	0	0	10	5	
Total Credits					20	

#Students have to register either 21MEP401L or 21MEP402L and 21MEP403L both in eighth semester and either 21MEP501L or 21MEP502L and 21MEP503L in tenth semester





SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India