

ACADEMIC CURRICULA

POST GRADUATE DEGREE PROGRAMMES

Master of Technology

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 21 Curriculum



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

41 M.Tech in Thermal Engineering

41. (a) Department Vision Statement

Stmnt - 1	<i>To enhance learning and research skills in mechanical engineering and allied fields to accomplish crest positions in world-renowned organizations.</i>
-----------	---

41. (b) Department Mission Statement

Stmnt - 1	<i>To impart quality education to produce eminent mechanical engineers.</i>
Stmnt - 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>
Stmnt - 3	<i>To inculcate progressive education and intricate facts through cognitive training programs to the faculty and students using state-of-art facilities.</i>

41. (c) Program Education Objectives (PEO)

PEO - 1	<i>Acquire knowledge to attain significant position of leadership in solar energy sector</i>
PEO - 2	<i>Focusing on lifelong learning through advanced research to enhance the performance of Solar energy systems</i>
PEO - 3	<i>Become a consultant for providing solutions for energy problems in energy and environmental sector</i>
PEO - 4	<i>Become a successful entrepreneur in manufacturing or marketing solar energy products for sustainable development</i>
PEO - 5	<i>Lead an ethical life for developing environmentally benign and economically affordable energy products</i>

41. (d) Consistency of PEO's with Mission of the Department

	Mission Stmnt. - 1	Mission Stmnt. - 2	Mission Stmnt. - 3
PEO - 1	3	3	3
PEO - 2	3	2	2
PEO - 3	3	3	3
PEO - 4	3	1	3
PEO - 5	3	2	3

41. (e) PO – Program Outcomes

PO - 1	<i>An ability to independently carry out research /investigation and development work to solve practical problems.</i>
PO - 2	<i>An ability to write and present a substantial technical report/document.</i>
PO - 3	<i>Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.</i>

41. (f) Consistency of PEO's with Program Outcomes (PO)

	Program Outcomes (PO)		
	1	2	3
PEO - 1	3	3	3
PEO - 2	3	3	3
PEO - 3	2	3	2
PEO - 4	2	1	1
PEO - 5	3	3	2

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

Professional Core Courses (C)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MAC501T	Computational Methods	3	1	0	4	
21MEC541J	Advanced Fluid Dynamics	3	0	2	4	
21MEC542J	Advanced Heat Transfer	3	0	2	4	
21MEC543J	Computational Fluid Dynamics	3	0	2	4	
21MEC541T	Materials for Heat Transfer	3	0	0	3	
21IPC501J ²	Research Methodology	2	1	2	4	
21MEC601T ¹	Case Studies	3	0	0	3	
Total Credits					26	
Project Work, Internship In Industry / Higher Technical Institutions (P)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEP501L	Specialization Project (OR)	0	0	40	20	
21MEP502L	Specialization Project	0	0	30	15	
21MEP503L	Domain Internship	0	0	10	5	
Total Credits					20	
Open Elective Course (O)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEO501T	Industrial Safety	3	0	0	3	
21MEO502T	Entrepreneurship and IPR	3	0	0	3	
21MEO503T	Operations Research	3	0	0	3	
21MEO504T	Human Body Mechanics	3	0	0	3	
21MEO505T	Energy Storage Systems	3	0	0	3	
Total Credits					3	
Assessment by Open Book Examination (²)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEE536J ²	Modelling and Analysis of Energy Systems	2	0	2	3	
21IPC501J ²	Research Methodology	2	1	2	4	
Course Delivery by online mode (³)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEE535T ³	Advanced Energy Storage	3	0	0	3	
100% assessment by the Department (¹)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEC601T ¹	Case Studies	3	0	0	3	
21MEE600T ¹	Journal Publication	0	0	0	3	

All elective courses may be studied under MOOC platform

¹ 100% assessment by the Department

² Assessment by Open Book Examination

³ Course Delivery through online mode

Professional Elective Courses (E)						
Specialization: Electronic Cooling/ Computational Fluid Dynamics						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEE542T	Transport in Porous Media	3	0	0		
21MEE544J	Compressible and Incompressible Fluid Flows	2	0	2		3
21MEE545J	Thermal Design for Electronic Equipment	2	0	2		3
21MEE543T	Radiative Heat Transfer	3	0	0		
21MEE544T	Micro and Nano scale Heat Transfer and Fluid Flow	3	0	0		3
21MEE545T	Introduction to Turbulence	3	0	0		
21MEE546J	Heat Transfer in Electronic Systems	2	0	2		3
21MEE547J	High Performance Computing in CFD	2	0	2		
21MEE546T	Power Electronics Design Fundamentals	3	0	0		3
21MEE633J	Measurement Techniques in Energy Systems	2	0	2		
21MEE547T	Introduction to Multiphase Flows	3	0	0		3
21MEE548T	Convection and Two-Phase Flow	3	0	0		
21MEE600T ¹	Journal Publication	0	0	0		
21MEE548J	Design of Heat Exchangers	2	0	2		3
21MEE549T	CFD of Turbomachinery	3	0	0		
Total Credits					21	
Professional Elective Courses (E)						
Specialization: Gas Dynamics/ Renewable Energy						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MEE536J ²	Modelling and Analysis of Energy Systems	2	0	2		3
21MEE550T	Combustion Technology	3	0	0		
21MEE551T	Hydrogen and Fuel Cells	3	0	0		3
21MEE552T	Hypersonic and High Temperature Gas Dynamics	3	0	0		
21MEE553T	Wind Energy Systems	3	0	0		3
21MEE554T	Elements of Gas Turbine Propulsion	3	0	0		
21MEE549J	Computational Fluid Dynamics for Energy Systems	2	0	2		3
21MEE555T	Design of Turbomachines	3	0	0		
21MEE550J	Solar Energy Technology	2	0	2		3
21MEE544J	Compressible and Incompressible Fluid Flows	2	0	2		

41. (h) Implementation Plan: M.Tech Thermal Engineering (Specialization: Electronic Cooling/ Computational Fluid Dynamics)

Semester - I					
Code	Course Title	Hours/ Week			
		L	T	P	C
21MAC501T	Computational Methods	3	1	0	4
21MEC541J	Advanced Fluid Dynamics	3	0	2	4
21MEC541T	Materials for Heat Transfer	3	0	0	3
21MEC542J	Advanced Heat Transfer	3	0	2	4
21IPC501J ²	Research Methodology	2	1	2	4
21MEE542T	Transport in Porous Media	3	0	0	3
21MEE544J	Compressible and Incompressible Fluid Flows	2	0	2	
Total Credits					22

Semester - II					
Code	Course Title	Hours/ Week			
		L	T	P	C
21MEC543J	Computational Fluid Dynamics	3	0	2	4
21MEE545J	Thermal Design for Electronic Equipment	2	0	2	3
21MEE543T	Radiative Heat Transfer	3	0	0	
21MEE544T	Micro and Nano Scale Heat Transfer and Fluid Flow	3	0	0	3
21MEE545T	Introduction to Turbulence	3	0	0	
21MEE546J	Heat Transfer in Electronic Systems	2	0	2	3
21MEE547J	High Performance Computing in CFD	2	0	2	
21MEE546T	Power Electronics Design Fundamentals	3	0	0	3
21MEE633J	Measurement Techniques in Energy Systems	2	0	2	
Total Credits					16

Semester - III					
Code	Course Title	Hours/ Week			
		L	T	P	C
	Open Elective	3	0	0	3
21MEE547T	Introduction to Multiphase flows	3	0	0	3
21MEE548T	Convection and Two-Phase Flow	3	0	0	
21MEE600T ¹	Journal Publication	0	0	0	3
21MEE548J	Design of Heat Exchangers	2	0	2	
21MEE549T	CFD of Turbomachinery	3	0	0	3
21MEC601T ¹	Case Studies	3	0	0	
Total Credits					12

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

41.(i) Implementation Plan: M.Tech Thermal Engineering (Specialization: Gas Dynamics/ Renewable Energy)

Semester - I						
Code	Course Title	Hours/ Week				
		L	T	P		
21MAC501T	Computational Methods	3	1	0	4	
21MEC541J	Advanced Fluid Dynamics	3	0	2	4	
21MEC541T	Materials for Heat Transfer	3	0	0	3	
21MEC542J	Advanced Heat Transfer	3	0	2	4	
21IPC501J ²	Research Methodology	2	1	2	4	
21MEE536J ²	Modeling and Analysis of Energy Systems	2	0	2	3	
21MEE550T	Combustion Technology	3	0	0		
Total Credits					22	

Semester - II						
Code	Course Title	Hours/ Week				
		L	T	P		
21MEC543J	Computational Fluid Dynamics	3	0	2	4	
21MEE551T	Hydrogen and Fuel Cells	3	0	0		
21MEE552T	Hypersonic and High Temperature Gas Dynamics	3	0	0	3	
21MEE553T	Wind Energy Systems	3	0	0		
21MEE554T	Elements of Gas Turbine Propulsion	3	0	0	3	
21MEE549J	Computational Fluid Dynamics for Energy Systems	2	0	2	3	
21MEE555T	Design of Turbomachines	3	0	0		
21MEE550J	Solar Energy Technology	2	0	2		
21MEE544J	Compressible and Incompressible Fluid Flows	2	0	2	3	
Total Credits					16	

Semester - III						
Code	Course Title	Hours/ Week				
		L	T	P		
	Open Elective	3	0	0	3	
21MEE535T ³	Advanced Energy Storage	3	0	0		
21MEE556T	Flow and Thermal Instabilities	3	0	0	3	
21MEE600T ¹	Journal Publication	0	0	0		
21MEE557T	Power Electronics for Renewable Energy Systems	3	0	0	3	
21MEE552J	CFD and its Applications to Engine Processes	2	0	2		
21MEC601T ¹	Case Studies	3	0	0	3	
Total Credits					12	

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

Students must register either 21MEP501L or 21MEP502L and 21MEP503L both in fourth semester

41. (j) Program Articulation Matrix: M.Tech Thermal Engineering (Specialization: Electronic Cooling/ Computational Fluid Dynamics)

Course Code	Course Name	Programme Outcomes		
		1	2	3
21MAC501T	Computational Methods	3	3	
21MEC541J	Advanced Fluid Dynamics	3		
21MEC542J	Advanced Heat Transfer	2	2.5	3
21MEC543J	Computational Fluid Dynamics	2.8	2.8	
21MEC541T	Materials for Heat Transfer	2	2	2
21MEE542T	Transport in Porous Media	2	2	2
21MEE544J	Compressible and Incompressible Fluid Flows	2		2
21MEE545J	Thermal Design for Electronic Equipment	2		3
21MEE543T	Radiative Heat Transfer	2		3
21MEE544T	Micro and Nano scale Heat Transfer and Fluid Flow	3	2	
21MEE545T	Introduction to turbulence	3		
21MEE546J	Heat Transfer in Electronic Systems	2.2	2.6	
21MEE547J	High Performance Computing in CFD	1	2.6	3
21MEE546T	Power Electronics Design Fundamentals	2	1	3
21MEE633J	Measurement Techniques in Energy Systems	3	2	1
21MEE547T	Introduction to Multiphase flows	1	2	3
21MEE548T	Convection and Two-Phase Flow	3	2	
21MEE600T	Journal Publication			
21MEE548J	Design of Heat Exchangers	2.6	2.8	
21MEE549T	CFD of Turbomachinery	3	3	
21IPC501J	Research Methodology	3	2.6	
	Open Elective			
21MEC601T	Case Studies			
21MEP501L	Specialization Project			
21MEP502L	Specialization Project			
21MEP503L	Domain Internship			
Program Average				

41. (k) Program Articulation Matrix: M.Tech Thermal Engineering (Specialization: Gas Dynamics/ Renewable Energy)

Course Code	Course Name	Programme Outcomes		
		1	2	3
21MEC541J	Advanced Fluid Dynamics	3		
21MEC542J	Advanced Heat Transfer	2	2.5	3
21MEC543J	Computational Fluid Dynamics	2.8	2.8	
21MAC501T	Computational Methods	3	3	
21MEC541T	Materials for Heat Transfer	2	2	2
21MEE536J	Modeling and Analysis of Energy Systems	3		
21MEE550T	Combustion Technology	1.6	1	
21MEE551T	Hydrogen and Fuel Cells	1.6		
21MEE552T	Hypersonic and High Temperature Gas Dynamics	3	1.8	3
21MEE553T	Wind Energy Systems	3	2	
21MEE554T	Elements of Gas Turbine Propulsion	2	1.6	1
21MEE549J	Computational Fluid Dynamics for Energy Systems	2.8	2.8	
21MEE555T	Design of Turbomachines	2	2.75	1.25
21MEE550J	Solar Energy Technology	2.8	2	
21MEE544J	Compressible and Incompressible Fluid Flows	2		2
21MEE535T	Advanced Energy Storage	2.4	2	
21MEE556T	Flow and Thermal Instabilities	3		
21MEE600T	Journal Publication			
21MEE557T	Power Electronics for Renewable Energy Systems	2	1	3
21MEE552J	CFD and its Applications to Engine Processes	2.4	2	
21IPC501J	Research Methodology	3	2.6	
	Open Elective			
21MEC601T	Case Studies			
21MEP501L	Specialization Project			
21MEP502L	Specialization Project			
21MEP503L	Domain Internship			
Program Average				

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



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India