

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)

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

2. M.Tech in Automotive Hybrid Systems Engineering*

2. (a) Department Vision Statement

Stmnt - 1	<i>The department of Automobile Engineering is committed to offering students a transformative educational journey.</i>
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2. (b) Department Mission Statement

Stmnt - 1	<i>To impart students with quality education centered on altering global requirements and add values to their career desires.</i>
Stmnt - 2	<i>To enhance the knowledge and skill of students in collaboration with public and private sectors.</i>
Stmnt - 3	<i>To identify and acknowledge economic, social and environmental issues that influences the quality of life in the vicinity and the globe.</i>
Stmnt - 4	<i>To inculcate leadership qualities needed for automotive industries through robust curriculum with international outlook for sustainable future.</i>
Stmnt - 5	<i>To build trust and co-operation at the workplace through effective inter-personal and communication skills.</i>

2. (c) Program Education Objectives (PEO)

PEO - 1	<i>To promote knowledge on state-of-the-art technologies pertaining to hybrid electric vehicle system design, architecture, and its subsystems</i>
PEO - 2	<i>To provide practical oriented training in line to emerging automobile industrial needs for potential job prospects.</i>
PEO - 3	<i>To facilitate students with various higher education and research opportunities.</i>
PEO - 4	<i>To promote entrepreneurship skills and related strategies.</i>

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

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

2. (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>

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

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

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

* Industry (NFTDC Hyderabad) Supported Program – student will be in campus for only 1 semester

2. (g) Programme Structure: M.Tech Automotive Hybrid Systems Engineering

Professional Core Courses (C)							Professional Elective Courses (E) (Any 7 Courses)						
Course Code	Course Title	Hours/Week			C		Course Code	Course Title	Hours/Week			C	
		L	T	P					L	T	P		
21MAC501T	Computational Methods	3	1	0	4		21AUE501T	Combustion and Heat Transfer in Internal Combustion Engines	3	0	0	3	
21AUC501T	Automotive Engine and Transmission Systems	3	1	0	4		21AUE502T	Thermal Management of Hybrid systems	3	0	0	3	
21AUC502T	Hybrid Electric Vehicle System Design Architecture	2	1	0	3		21AUE512T	Instrumentation and Control Systems	2	1	0	3	
21AUC514J	Power Electronics in Electric Vehicles	3	0	2	4		21AUE513T	Electric Vehicle Testing, Standards and Legislation	3	0	0	3	
21AUC523J ²	Energy Storage and Management	3	0	2	4		21AUE514J	Design and Simulation of Motors for Electric Vehicle Application	2	0	2	3	
21IPC501J ²	Research Methodology	2	1	2	4		21AUE515T	Internet of Things for Electric Vehicle Application	3	0	0	3	
21AUC601T ¹	Case Studies	3	0	0	3		21AUE516T	Alternate Powertrain Technology	3	0	0	3	
Total Credits						26	21AUE517T	Electro Hydraulic Transmission Systems	3	0	0	3	
							21AUE518T	Advanced Hydraulic Systems	3	0	0	3	
							21AUE519T	Automotive Air Conditioning and Heating Systems	3	0	0	3	
							21AUE611T	Artificial Intelligence for Electric Vehicle Application	3	0	0	3	
							21AUE612T	Motor Drives and Control Systems	3	0	0	3	
							21AUE613T	Electric Vehicle Modelling and Design	2	1	0	3	
							21AUE614T	Charging Station System Design	2	1	0	3	
							21AUE615T	Automotive Embedded Systems and Communication	3	0	0	3	
							21AUE616T	Advanced Automotive Electronics	3	0	0	3	
							21AUE600T ¹	Journal Publication	0	0	0	3	
							Total Credits						21
							Open Elective Courses (O)						
Course Code	Course Title	Hours/Week			C		Course Code	Course Title	Hours/Week			C	
		L	T	P					L	T	P		
		3	0	0	3				3	0	0	3	
							Total Credits						3
							Assessment by Open Book Examination (2)						
Course Code	Course Title	Hours/Week			C		Course Code	Course Title	Hours/Week			C	
		L	T	P					L	T	P		
21AUC523J ²	Energy Storage and Management	3	0	2	4		21AUC601T ¹	Case Studies	3	0	0	3	
21IPC501J ²	Research Methodology	2	1	2	4		21AUE600T 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

2. (h) Implementation Plan: M.Tech Automotive Hybrid Systems Engineering

Semester - I							Semester - II						
Code	Course Title	Hours/Week					Code	Course Title	Hours/Week				
		L	T	P	C				L	T	P	C	
21MAC501T	Computational Methods	3	1	0	4		21AUC514J	Power Electronics in Electric Vehicles	3	0	2	4	
21AUC501T	Automotive Engine and Transmission Systems	3	1	0	4		21AUC523J ²	Energy Storage and Management	3	0	2	4	
21AUC502T	Hybrid Electric Vehicle System Design Architecture	2	1	0	3			Professional Elective-2				3	
21IPC501J ²	Research Methodology	2	1	2	4			Professional Elective-3				3	
	Professional Elective-1				3			Professional Elective-4				3	
Total Credits						18	Total Credits						17
Semester - III							Semester - IV						
Code	Course Title	Hours/Week					Code	Course Title	Hours/Week				
		L	T	P	C				L	T	P	C	
	Open Elective	3	0	0	3		21AUP501L	Specialization Project (OR)	0	0	40	20	
	Professional Elective-5				3		21AUP502L	Specialization Project	0	0	30	15	
21AUE600T ¹	Professional Elective-6				3		21AUP503L	Domain Internship	0	0	10	5	
	Journal Publication				3		Total Credits						20
	Professional Elective-7				3								
21AUC601T ¹	Case Studies	3	0	0	3								
Total Credits						15							

Students must register either 21AUP501L or 21AUP502L and 21AUP503L both in fourth semester

2. (i) Program Articulation Matrix: M.Tech Automotive Hybrid Systems Engineering

Course Code	Course Name	Programme Outcomes		
		1	2	3
21MAC501T	Computational Methods	3	3	
21AUC501T	Automotive Engine and Transmission Systems			
21AUC502T	Hybrid Electric Vehicle System Design Architecture			
21AUC514J	Power Electronics in Electric Vehicles			
21AUC523J	Energy Storage and Management			
21AUC601T	Case Studies			
21AUE501T	Combustion and Heat Transfer in Internal Combustion Engines			
21AUE502T	Thermal Management of Hybrid systems			
21AUE512T	Instrumentation and Control Systems			
21AUE513T	Electric Vehicle Testing, Standards and Legislation			
21AUE514J	Design and Simulation of Motors for Electric Vehicle application			
21AUE515T	Internet of Things for Electric Vehicle Application			
21AUE516T	Alternate Powertrain Technology			
21AUE517T	Electro Hydraulic Transmission Systems			
21AUE518T	Advanced Hydraulic Systems			
21AUE519T	Automotive Air conditioning and Heating Systems			
21AUE611T	Artificial Intelligence for Electric Vehicle application			
21AUE612T	Motor Drives and Control Systems			
21AUE613T	Electric Vehicle Modelling and Design			
21AUE614T	Charging Station System Design			
21AUE615T	Automotive Embedded Systems and Communication			
21AUE616T	Advanced Automotive Electronics			
21AUE600T	Journal Publication			
21IPC501J	Research Methodology	3	2.6	
	Open Elective			
21AUP501L	Specialization Project			
21AUP502L	Specialization Project			
21AUP503L	Domain Internship			
Program Average				

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

3. (g) Programme Structure: M.Tech Automotive Technology

Professional Core Courses (C)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21MAC501T	Computational Methods	3	1	0	4	
21AUC521J	Automotive Mechanical Systems	2	0	2	3	
21AUC522J	Automotive Electrical and Power Electronics	3	0	2	4	
21AUC523J ²	Energy Storage and Management	3	0	2	4	
21AUC524J	Embedded Systems and Communication for Automotive Applications	3	0	2	4	
21IPC501J ²	Research Methodology	2	1	2	4	
21AUC601T ¹	Case Studies	3	0	0	3	
Total Credits					26	

Professional Elective Courses (E) (Any 7 Courses)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21AUE511T	Thermal Management for Electric Vehicle Systems	2	1	0	3	
21AUE512T	Instrumentation and Control Systems	2	1	0	3	
21AUE514J	Design and Simulation of Motors for Electric Vehicle Application	2	0	2	3	
21AUE521J	Automotive Transducers and Signal Conditioners	2	0	2	3	
21AUE522J	Intelligent Algorithms and Control	2	0	2	3	
21AUE523J	Control Systems Algorithm	2	0	2	3	
21AUE524J	Advanced Communication Protocols	2	0	2	3	
21AUE621J	Vehicle Design and Dynamics	2	0	2	3	
21AUE622J	Automotive Testing and Certification	2	0	2	3	
21AUE623T	Autonomous and Connected Vehicles	2	1	0	3	
21AUE600T ¹	Journal Publication	0	0	0	3	
Total Credits					21	

Project Work, Internship In Industry / Higher Technical Institutions (P)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21AUP501L	Specialization Project (OR)	0	0	40	20	
21AUP502L	Specialization Project	0	0	30	15	
21AUP503L	Domain Internship	0	0	10	5	
Total Credits					20	

100% assessment by the Department (1)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21AUC601T ¹	Case Studies	3	0	0	3	
21AUE600T ¹	Journal Publication	0	0	0	3	

Open Elective Courses (O)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
		3	0	0	3	
Total Credits					3	

Assessment by Open Book Examination (2)						
Course Code	Course Title	Hours/Week			C	
		L	T	P		
21AUC523J ²	Energy Storage and Management	3	0	2	4	
21IPC501J ²	Research Methodology	2	1	2	4	

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