

ACADEMIC CURRICULA

UNDERGRADUATE/ INTEGRATED

POST GRADUATE DEGREE

PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 1

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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

43. B.Tech. in Mechatronics Engineering (Autonomous Driving Technology)

43. (a) Mission of the Department

Mission Stmt – 1	<i>To impart the principles of Mechatronics Engineering to produce engineers who are capable of competing on the global stage.</i>
Mission Stmt – 2	<i>To excel at solving multidisciplinary challenges through structured teaching-learning methods and by providing state-of-the-art facilities.</i>
Mission Stmt – 3	<i>To cultivate future leaders with a strong sense of integrity, communication, teamwork, and entrepreneurship</i>

43. (b) Program Educational Objectives (PEO)

PEO – 1	<i>Graduates will demonstrate a commitment to lifelong learning and career growth through participation and leadership in professional societies and organizations</i>
PEO – 2	<i>Graduates will advance professionally with a competency to solve challenges in industry, research, and academia leading to sustainable development of the society</i>
PEO – 3	<i>Graduates will be capable of solving ever-evolving-complex-system-integration problems through inter-disciplinary approaches.</i>
PEO – 4	<i>Graduates will be versatile in dealing with systems from a variety of modern engineering and technology fields with ease.</i>

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

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

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

43. (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	-	-	-	-	-	1	1	2	-	2	-	3	1	-	3
PEO - 2	3	-	-	3	3	3	3	3	2	2	3	-	3	2	3
PEO - 3	3	3	3	3	3	2	1	-	3	3	2	1	3	2	3
PEO - 4	3	3	2	1	3	1	-	1	1	-	-	-	2	1	1

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

PSO – Program Specific Outcomes (PSO)

PSO - 1	<i>Graduates will apply scientific principles for modelling and simulation of multi-disciplinary engineering systems</i>
PSO - 2	<i>Graduates will be able to interpret specifications of elements to design and develop an integrated system</i>
PSO - 3	<i>Graduates will be able to implement autonomous driving technology by applying the state-of-the-art system integration methods applicable for self-driving vehicles</i>

43. (e) Program Structure: B.Tech. in Mechatronics Engineering (Autonomous Driving Technology)

Humanities & Social Sciences including Management Courses (H)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
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	
21GNH401TA	Behavioral Psychology	2	1	0	3	
Total Credits					13	
Professional Elective Courses (E) (Any 7 Courses)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
Foundation Courses (Minimum 2 Courses)						
21MHE437J	Computational Techniques for Autonomous Vehicles	2	0	2	3	
21MHE438T	Foundations of Autonomous Vehicles	3	0	0	3	
21MHE439T	Introduction to Automotive Technology	3	0	0	3	
Technology Enablers (Minimum 4 Courses)						
21MHE440J	Perception for Autonomous Vehicles	2	0	2	3	
21MHE441J	Localization and State Estimation	2	0	2	3	
21MHE442J	Motion Planning and Control	2	0	2	3	
21MHE443T	Vehicle Mechanics	3	0	0	3	
21MHE444J	AI for Perception, Planning and Control	2	0	2	3	
21MHE445L ¹	Capstone Project	0	0	6	3	
Other Courses						
21MHE446T	Connected Vehicles	3	0	0	3	
21MHE447T	Safety, Ethics and Regulations for Driverless Cars	3	0	0	3	
21MHE448T	Infrastructure for Self-Driving Technology	3	0	0	3	
21MHE449T	Software Architecture for Self-Driving Vehicles	2	1	0	3	
Total Credits					21	
Open Elective Courses (O) (Any 3 Course)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
21MHO301T	Smart Farming	3	0	0	3	
Total Credits					03	

Basic Science Courses (B)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
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	
21PYB104J	Physics: Mechanics	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			C	
		L	T	P		
21MHC101P ¹	Elements of Mechatronics Systems	2	1	0	3	
21MHC201T	Electrical actuators and Drives	3	0	0	3	
21MHC202J	Analog and Digital Electronics	2	0	2	3	
21MHC203J	Fluid power system and Automation	2	0	2	3	
21MHC204L ¹	Electrical Actuators and Drives Laboratory	0	0	2	1	
21MHC205T	Microcontroller and Embedded Systems	3	0	0	3	
21MHC206T	Mechanics of Solids and Fluids	3	0	0	3	
21MHC207L ¹	Microcontroller and Embedded Systems Laboratory	0	0	2	1	
21MHC208L ¹	Mechanics of Solids and Fluids Laboratory	0	0	2	1	
21MHC209T	Project Management and Industrial Practices	2	1	0	3	
21CSC206T	Artificial Intelligence	2	1	0	3	
21MHC301T	System Dynamics and Control	3	0	0	3	
21MHC302J	Design and Analysis of Machine Elements	2	0	2	3	
21MHC303J	Measurement, Sensors and Interfaces	2	0	2	3	
21MHC304L ¹	Modelling and Control Laboratory	0	0	2	1	
21MHC305J	Manufacturing Processes	2	0	2	3	
21MHC306T	Kinematics and Dynamics of Mechanisms	3	0	0	3	
21MHC307P ¹	Model Based Systems Engineering	1	2	0	3	
Total Credits					46	
Non Credit Courses (M)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
21PDM101L ¹	Professional Skills and Practices	0	0	2	0	
21PDM102L ¹	General Aptitude	0	0	2		
21PDM201L ¹	Verbal Reasoning	0	0	2		
21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2		
21PDM301L ¹	Analytical and Logical Thinking Skills	0	0	2		
21PDM302L ¹	Employability Skills and Practices	0	0	2		
21CYM101T ¹	Environmental Science	1	0	0		0
21LEM101T ¹	Constitution of India	1	0	0		0
21LEM102T ¹	Universal Human Values – Introduction	1	0	0		0
21LEM201T ¹	Professional Ethics	1	0	0		0
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0		3
21LEM301T ¹	Indian Art Form	1	0	0		0
21LEM302T ¹	Indian Traditional Knowledge	1	0	0		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					03	

Engineering Science Courses (S)						Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)					
Course Code	Course Title	Hours / Week			C	Course Code	Course Title	Hours / Week			C
		L	T	P				L	T	P	
21CSS101J	Programming for Problem Solving	3	0	2	4	21GNP301L ¹	Community Connect	0	0	2	1
21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2	21MHP302L ¹	Project	0	0	6	3
21MES102L ¹	Engineering Graphics and Design	0	0	4	2	21MHP303T ¹	MOOC	3	0	0	
21EES101T	Electrical and Electronics Engineering	3	1	0	4	21MHP401L	Major Project	0	0	30	15
21MHS201T	Thermodynamics and Heat Transfer	3	0	0	3	21MHP402L	Major Project	0	0	20	10
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3	21MHP403L	Internship#	0	0	10	5
21CSS303T	Data Science	2	0	0	2	Total Credits					19
Total Credits					20						

43. (f) Implementation Plan: B.Tech. in Mechatronics Engineering (Autonomous Driving Technology)

Semester - I							Semester - II						
Course Code	Course Title	Hours / Week			C		Course Code	Course Title	Hours / Week			C	
		L	T	P					L	T	P		
21LEH101T	Communicative English	2	1	0	3		21LEH102T	Chinese					
21MAB101T	Calculus and Linear Algebra	3	1	0	4		21LEH103T	French					
21PYB104J	Physics :Mechanics	3	1	2	5		21LEH104T	German					
21MES102L ¹	Engineering Graphics and Design	0	0	4	2		21LEH105T	Japanese	2	1	0	3	
21EES101T	Electrical and Electronics Engineering	3	1	0	4		21LEH106T	Korean					
21CYM101T ¹	Environmental Science*	1	0	0	0		21LEH107T	Spanish					
21PDM101L ¹	Professional Skills and Practices	0	0	2	0		21LEH108T	Russian					
21LEM101T ¹	Constitution of India	1	0	0	0		21GNH101J	Philosophy of Engineering	1	0	2	2	
Total Credits						18	21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4	
Semester - III							21CYB101J	Chemistry	3	1	2	5	
Course Code	Course Title	Hours / Week			C		21MHC101P ¹	Elements of Mechatronics systems	2	1	0	3	
		L	T	P			21CSS101J	Programming for Problem Solving	3	0	2	4	
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4		21BTB103T	Biology	2	0	0	2	
21MHC201T	Electrical Actuators and Drives	3	0	0	3		21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2	
21MHC202J	Analog and Digital Electronics	2	0	2	3		21PDM102L ¹	General Aptitude*	0	0	2	0	
21MHC203J	Fluid power system and Automation	2	0	2	3		21GNM101L ¹	Physical and Mental Health using Yoga					
21PDH209T ¹	Social Engineering	2	0	0	2		21GNM102L ¹	National Service Scheme	0	0	2	0	
21MHS201T	Thermodynamics and Heat Transfer	3	0	0	3		21GNM103L ¹	National Cadet Corps					
21MHC204L ¹	Electrical Actuators and Drives Laboratory	0	0	2	1		21GNM104L ¹	National Sports Organization					
21LEM201T ¹	Professional Ethics*	1	0	0	0		Total Credits						25
21PDM201L ¹	Verbal Reasoning*	0	0	2	0		Semester - IV						
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3		Course Code	Course Title	Hours / Week			C	
Total Credits						22			L	T	P		
Semester - V							21MAB202T	Numerical methods	3	1	0	4	
Course Code	Course Title	Hours / Week			C		21CSC206T	Artificial Intelligence	2	1	0	3	
		L	T	P			21MHC205T	Microcontroller and Embedded Systems	3	0	0	3	
21MAB301T	Probability and Statistics	3	1	0	4		21MHC206T	Mechanics of Solids and Fluids	3	0	0	3	
21MHC301T	System Dynamics and Control	3	0	0	3		21MHC207L ¹	Microcontroller and Embedded Systems Laboratory	0	0	2	1	
21MHC303J	Measurement, Sensors and Interfaces	2	0	2	3		21MHC208L ¹	Mechanics of Solids and Fluids Laboratory	0	0	2	1	
21MHC302J	Design and Analysis of Machine Elements	2	0	2	3		21MHC209T	Project Management and Industrial Practices	2	1	0	3	
	Professional Elective – II	3	0	0	3		21DCS201P ¹	Design Thinking and Methodology	1	2	0	3	
	Open Elective – I	3	0	0	3			Professional Elective – I	3	0	0	3	
21MHC304L ¹	Modelling and Control Laboratory	0	0	2	1		21PDM202L ¹	Critical and Creative Thinking Skills*	0	0	2	0	
21PDM301L ¹	Analytical and Logical Thinking Skills*	0	0	2	0		Total Credits						24
21LEM301T ¹	Indian Art Form	1	0	0	0		Semester - VI						
21GNP301L ¹	Community Connect	0	0	2	1		Course Code	Course Title	Hours / Week			C	
Total Credits						21			L	T	P		
Semester - VII							21CSS303T	Data Science	2	0	0	2	
Course Code	Course Title	Hours / Week			C		21MHC305J	Manufacturing Processes	2	0	2	3	
		L	T	P			21MHC306T	Kinematics and Dynamics of Mechanisms	3	0	0	3	
21GNH401TA	Behavioural Psychology	2	1	0	3		21MHC307P ¹	Model Based Systems Engineering	1	2	0	3	
	Professional Elective – IV	3	0	0	3			Professional Elective – III	3	0	0	3	
	Professional Elective – V	3	0	0	3		21MHP302L ¹	Project	0	0	6	3	
	Professional Elective – VI				3		21MHP303T ¹	MOOC	3	0	0	3	
	Professional Elective – VII				3		O	Open Elective – II	3	0	0	3	
O	Open Elective – III	3	0	0	3		21PDM302L ¹	Employability Skills and Practices*	0	0	2	0	
Total Credits						18	21LEM302T ¹	Indian Traditional Knowledge	1	0	0	0	
							Total Credits						20
Semester - VIII							Semester - VIII						
Course Code	Course Title	Hours / Week			C		Course Code	Course Title	Hours / Week			C	
		L	T	P					L	T	P		
21MHP401L	Major Project	0	0	30	15		21MHP401L	Major Project	0	0	30	15	
21MHP402L	Major Project	0	0	20	10		21MHP402L	Major Project	0	0	20	10	
21MHP403L	Internship#	0	0	10	5		21MHP403L	Internship#	0	0	10	5	
							Total Credits						15

#Students have to register either 21MHP401L or 21MHP402L and 21MHP403L both in eighth semester