

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

45. B.Tech. in Mechatronics Engineering (Industrial IoT and Systems Engineering)

45. (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>

45. (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>

45. (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

45. (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	3	-	-
PEO - 2	3	-	-	3	3	3	3	3	2	2	3	-	-	-	2
PEO - 3	3	3	3	3	3	2	1	-	3	3	2	1	2	3	-
PEO - 4	3	3	2	1	3	1	-	1	1	-	-	-	-	3	3

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 develop IoT solutions and apply systems engineering principles and techniques to integrate complex systems for a wide variety of applications.</i>

45. (e) Program Structure: B.Tech. in Mechatronics Engineering (Industrial IoT and Systems 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					
21LEH103T	French					
21LEH104T	German					
21LEH105T	Japanese	2	1	0	3	
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						

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	
21MHS201T	Thermodynamics and Heat Transfer	3	0	0	3	
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3	
21CSS303T	Data Science	2	0	0	2	
Total Credits 20						

Non Credit Courses (M)						
Course Code	Course Title	Hours / Week				
		L	T	P	C	
21PDM101L ¹	Professional Skills and Practices	0	0	2		
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					
21GNM102L ¹	National Service Scheme	0	0	2	0	
21GNM103L ¹	National Cadet Corps					
21GNM104L ¹	National Sports Organization					
Total Credits 03						

Open Elective Courses (O) (Any 3 Course)						
Course Code	Course Title	Hours/ Week				
		L	T	P	C	
21MHO301T	Smart Farming	3	0	0	3	
Total Credits 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	
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				
		L	T	P	C	
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						

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	
21MHP302L ¹	Project	0	0	6		
21MHP303T ¹	MOOC	3	0	0	3	
21MHP401L	Major Project	0	0	30	15	
21MHP402L	Major Project	0	0	20	10	
21MHP403L	Internship#	0	0	10	5	
Total Credits 19						

Professional Elective Courses (E) (Any 7 Courses)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
IIoT Courses (Minimum 4 Courses)						
21MHE465T	Introduction to IIoT and IIoT	3	0	0	3	
21MHE466T	Foundations of Digital and Smart Manufacturing Technology	3	0	0	3	
21MHE467J	Sensors and Actuators for IIoT	2	0	2	3	
21MHE468T	Communication Networks in IIoT	3	0	0	3	
21MHE469J	Cyber Physical System Design	2	0	2	3	
21MHE470T	Cloud Computing, Big Data Analytics and Security	3	0	0	3	
21MHE471J	X-Reality for Industry 4.0	2	0	2	3	
21MHE472J	AI and Robotics in Smart Factories	2	0	2	3	
21MHE473J	Data Modelling and Simulation	2	0	2	3	

Professional Elective Courses (E)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
System Engineering (Minimum 3 Courses)						
21MHE474T	Foundations of Systems Engineering	2	1	0	3	
21MHE475J	Systems Architecture and Design	2	0	2	3	
21MHE476J	Object Process Modelling and SysML	2	0	2	3	
21MHE477J	Verification and Validation	2	0	2	3	
21MHE478L ¹	Capstone Project	0	0	6	3	
21MHE479J	Optimization Techniques in Systems Engineering	2	0	2	3	
					Total Credits	21

45. (f) Implementation Plan: B.Tech. in Mechatronics Engineering (Industrial IoT and Systems Engineering)

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 Lab	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
Students have to register either 21MHP401L or 21MHP402L and 21MHP403L both in eighth semester						Total Credits					20
Semester - VIII						Course Code	Course Title	Hours / Week			C
								L	T	P	
						21MHP401L	Major Project	0	0	30	15
						21MHP402L	Major Project	0	0	20	10
						21MHP403L	Internship#	0	0	10	5
Total Credits						Total Credits					15