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 AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

46. B.Tech. in Mechatronics Engineering with Specialization in Robotics

46. (a) Mission of the Department

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

46. (b) Program Educational Objectives (PEO)

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

46. (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

46. (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			
	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	PSO-1	PSO-2	PSO-3
PEO - 1	-	-	-	-	-	*1*	*1*	*2*	-	*2*	-	-	-	*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*	-
PEO - 4	*3*	*3*	*2*	*1*	*3*	*1*	-	-	*1*	*1*	-	-	*2*	*2*	*2*

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

PSO – Program Specific Outcomes (PSO)

PSO - 1	*Graduates will apply scientific principles for modelling and simulation of multi-disciplinary engineering systems*
PSO - 2	*Graduates will be able to interpret specifications of elements to design and develop an integrated system*
PSO - 3	*Graduates will be able to control Robotics systems using modern programming tools*

46. (e) Program Structure: B.Tech. in Mechatronics Engineering with Specialization in Robotics

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**

Professional Elective Courses (E)
(Any 7 Courses)

Course Code	Course Title	Hours / Week L	T	P	C
	Professional Elective -1				
21MHE451J	Manipulator Robotics	2	0	2	3
21MHE452L [1]	Computational Thinking Laboratory	0	0	5	3
	Professional Elective - 2				
21MHE453J	Mechanics of Manipulation	2	0	2	3
21MHE454J	Ground mobile Robotics	2	0	2	3
	Professional Elective - 3				
21MHE455T	Robot Control	3	0	0	3
21MHE456J	Vision Guided Robots	2	0	2	3
	Professional Elective - 4				
21MHE457L [1]	Robot Programming	0	0	5	3
21MHE458T	Model Based System Engineering for Robotics	3	0	0	3
	Professional Elective - 5				
21MHE459J	Planning and Decision Making in Robotics	2	0	2	3
21MHE460T	Advanced Robotics	3	0	0	3
	Professional Elective - 6				
21MHE461J	AI for Perception Planning and Control	2	0	2	3
21MHE462TT	Advanced Dynamical Systems	3	0	0	3
	Professional Elective - 7				
21MHE463T	Soft Robotics	3	0	0	3
21MHE464T	Introduction to Marine and Aerial Robotics	3	0	0	3
				Total Credits	**21**

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	**03**

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	Kinematic Analysis 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 L	T	P	C
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)

Course Code	Course Title	Hours / Week			C
		L	T	P	
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

Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)

Course Code	Course Title	Hours / Week			C
		L	T	P	
21GNP301L [1]	Community Connect	0	0	2	1
21MHP302L [1]	Project	0	0	6	3
21MHP303T [1]	MOOC	3	0	0	
21MHP401L	Major Project	0	0	30	15
21MHP402L	Major Project	0	0	20	10
21MHP403L	Internship#	0	0	10	5
				Total Credits	19

46. (f) Programme Articulation: B.Tech. in Mechatronics Engineering with Specialization in Robotics

Course Code	Course Name	Program Outcomes (PO)												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	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	PSO-1	PSO-2	PSO-3
21MHS201T	Thermodynamics and Heat Transfer	1	2	-	-	2	-	-	-	-	-	-	-	-	-	-
21MHC101P	Elements of Mechatronics Systems	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
21MHC201T	Electrical Actuators and Drives	3	2	2	-	-	-	-	-	-	-	-	-	-	1	2
21MHC202J	Analog and Digital Electronics	3	2	2	-	-	-	-	-	-	-	-	-	-	2	-
21MHC203J	Fluid Power System and Automation	3	2	2	-	1	-	-	-	-	-	-	-	-	1	2
21MHC204L	Electrical Actuators and Drives Laboratory	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
21MHC205T	Microcontroller and Embedded Systems	3	-	2	-	1	-	-	-	-	-	-	-	-	-	2
21MHC206T	Mechanics of Solids and Fluids	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
21MHC208L	Mechanics of Solids and Fluids Laboratory	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
21MHC207L	Microcontroller and Embedded Systems Laboratory	3	1	2	-	1	-	-	-	-	-	-	-	-	-	2
21MHC209T	Project Management and Industrial Practices	-	-	-	-	2	-	-	-	-	-	3	-	1	-	
21CSC206T	Artificial Intelligence	-	-	-	-	-	-	-	-	-	-	-	-		-	
21MHC301T	System Dynamics and Control	3	2	2	-	-	-	-	-	-	-	-	-	3	-	2
21MHC302J	Design and Analysis of Machine Elements	3	3	2	-	2	-	-	-	-	-	-	-	2	2	-
21MHC303J	Measurement, Sensors and Interfaces	3	1	2	-	-	-	-	-	-	-	-	-	1	-	-
21MHC304L	Modelling and Control Laboratory	2	2	3	-	2	-	-	-	-	-	-	-	3	-	2
21MHC305J	Manufacturing Processes	3	2	1	-		-	-	-	-	-	-	-	-	-	-
21MHC306T	Kinematic Analysis and Dynamics of Mechanisms	1	2	-	-	3	-	-	-	-	-	-	-	-	-	-
21MHC307P	Model Based Systems Engineering	3	3	-	2	1	-	-	-	-	-	-	-	2	2	-
21MHE451J	Manipulator Robotics	2	-	-	-	2	-	-	-	-	-	-	-	3	-	2
21MHE452L	Computational Thinking Laboratory	3	-	2	-	2	-	-	-	-	-	-	-	2	-	-
21MHE453J	Mechanics of Manipulation	3	2	2	-	-	-	-	-	-	-	-	-	2	-	-
21MHE454J	Ground mobile Robotics	3	3	2	-	-	-	-	-	-	-	-	-		3	2
21MHE455T	Robot Control	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
21MHE456J	Vision Guided Robots	3	2	2	-	2	-	-	-	-	-	-	-	2	-	-
21MHE457L	Robot Programming	3	2	3	-	2	-	-	-	-	-	-	-	-		3
21MHE458T	Model Based System Engineering for Robotics	3	3	-	-	2	-	-	-	-	-	-	-	2	2	2
21MHE459J	Planning and Decision Making in Robotics	3	-	-	-	2	-	-	-	-	-	-	-	1	1	1
21MHE460T	Advanced Robotics	3	1	-	-	-	-	-	-	-	-	-	-	1	1	
21MHE461J	AI for Perception Planning and Control	3	2	2	-	1	-	-	-	-	-	-	-	-	2	2
21MHE462T	Advanced Dynamical Systems	3	-	-	-	-	-	-	-	-	-	-	-	-	1	
21MHE463T	Soft Robotics	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
21MHE464T	Introduction to Marine and Aerial Robotics	3			-	-	-	-	-	-	-	-	-	2	-	-
Program Average																

46. (g) Implementation Plan: B.Tech. in Mechatronics Engineering with Specialization in Robotics

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
21PYB104J	Physics :Mechanics	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
21MHC101P [1]	Elements of Mechatronics systems	2	1	0	3
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	25

Semester - III

Course Code	Course Title	Hours / Week L	T	P	C
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4
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
21MHS201T	Thermodynamics and Heat Transfer	3	0	0	3
21MHC204L [1]	Electrical Actuators and Drives 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	22

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
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
	Professional Elective – I	3	0	0	3
21DCS201P [1]	Design Thinking and Methodology	1	0	4	3
21PDM202L [1]	Critical and Creative Thinking Skills*	0	0	2	0
				Total Credits	24

Semester - V

Course Code	Course Title	Hours / Week L	T	P	C
21MAB301T	Probability and Statistics	3	1	0	4
21MHC301T	System Dynamics and Control	3	0	0	3
21MHC303J	Measurement, Sensors and Interfaces	2	0	2	3
21MHC302J	Design and Analysis of Machine Elements	2	0	2	3
	Professional Elective – II	3	0	0	3
	Open Elective – I	3	0	0	3
21MHC304L [1]	Modelling and Control 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	21

Semester - VI

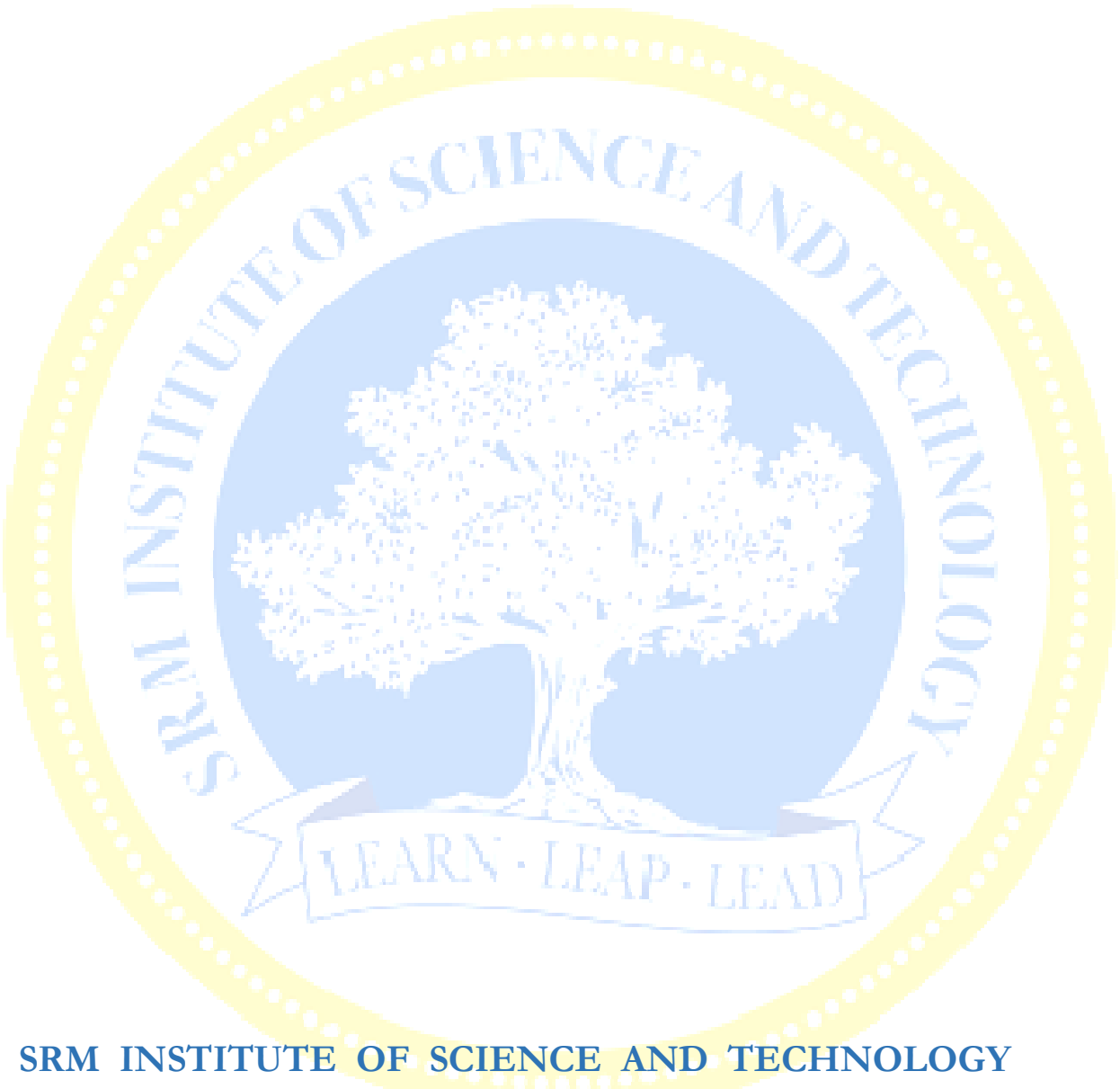
Course Code	Course Title	Hours / Week L	T	P	C
21CSS303T	Data Science	2	0	0	2
21MHC305J	Manufacturing Processes	2	0	2	3
21MHC306T	Kinematic Analysis and Dynamics of Mechanisms	3	0	0	3
21MHC307P [1]	Model Based Systems Engineering	1	2	0	3
	Professional Elective – III	3	0	0	3
21MHP302L [1]	Project	0	0	6	3
21MHP303T [1]	MOOC	3	0	0	
O	Open Elective – II	3	0	0	3
21PDM302L [1]	Employability Skills and Practices*	0	0	2	0
21LEM302T [1]	Indian Traditional Knowledge	1	0	0	0
				Total Credits	20

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
	Professional Elective – VI				3
	Professional Elective – VII				3
O	Open Elective – III	3	0	0	3
				Total Credits	18

Semester - VIII					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MHP401L	*Major Project*	*0*	*0*	*30*	*15*
21MHP402L	*Major Project*	*0*	*0*	*20*	*10*
21MHP403L	*Internship#*	*0*	*0*	*10*	*5*
				Total Credits	**15**

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