

# **ACADEMIC CURRICULA**

## **UNDERGRADUATE DEGREE PROGRAMMES**

### **Bachelor of Technology**

**(B.Tech. - Four Years)**

**(Choice Based Flexible Credit System)**

**Regulations 2018**

**Volume - 1**

**(Revised in March 2019)**



**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, Kancheepuram District 603203, Tamil Nadu,  
India**

## 31. B. Tech in Mechatronics Engineering

### 31. (a) Mission of the Department

Mission Stmt - 1	Provide goal-oriented, quality-based and value-added education
Mission Stmt - 2	Inculcate communication skills, leadership, ethics and strong entrepreneurship among students for their sustained growth through teaching and learning process.
Mission Stmt - 3	Prepare effective and responsible graduate to pursue higher studies and research for meeting global requirements by providing worldclass facilities
Mission Stmt - 4	A curriculum that is firmly grounded in engineering fundamentals
Mission Stmt - 5	An environment that is conducive to learning and encourages students from different genders and backgrounds

### 31. (b) Program Educational Objectives (PEO)

PEO - 1	Develop innovative and sustainable products with multidisciplinary Engineering expertise.
PEO - 2	Solve complex engineering problems by applying mechanical, electrical and computer knowledge and engage in lifelong learning in their profession.
PEO - 3	Work or pursue higher education in multicultural, multilingual and multinational environment with competent oral and written communication.
PEO - 4	Lead and contribute in a team entrusted with professional, social and ethical responsibilities.
PEO - 5	Practice in engineering-related fields chosen from a broad range of industries

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

	Mission Stmt - 1	Mission Stmt - 2	Mission Stmt - 3	Mission Stmt - 4	Mission Stmt - 5
PEO - 1	H	H	H	H	M
PEO - 2	H	H	M	M	H
PEO - 3	H	H	H	H	M
PEO - 4	M	M	H	H	M
PEO - 5	H	M	M	M	H

H – High Correlation, M – Medium Correlation, L – Low Correlation

### 31. (d) Mapping Program Educational Objectives (PEO) to Program Learning Outcomes (PLO)

	Program Learning Outcomes (PLO)													Program Specific Outcomes (PSO)		
	Graduate Attributes (GA)															
	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3	
PEO - 1	H	H	H	H	M	M	L	H	H	H	L	H	H	H	H	
PEO - 2	H	H	M	M	L	H	H	H	H	L	L	M	H	H	L	
PEO - 3	M	M	M	M	H	H	H	H	L	M	H	H	H	L	M	
PEO - 4	H	M	M	M	M	H	M	M	H	H	H	H	M	H	H	
PEO - 5	M	M	L	H	H	H	H	L	L	M	L	H	H	H	M	

H – High Correlation, M – Medium Correlation, L – Low Correlation

### PSO – Program Specific Outcomes (PSO)

PSO - 1	Ability to work in design, implementation and integration of engineering applications, such as electronic, mechanical, electromechanical, control and computer systems that contain software and hardware components, including sensors, actuators and controllers.
PSO - 2	Ability to recognize and apply the recent technological advancements for developing Mechatronics products to cater the global needs
PSO - 3	Ability to Automate and maintain the mechanical systems by using electrical and electronic devices as well as computational tools

### 31. (e) Program Structure: B.Tech. in Mechatronics Engineering

Humanities & Social Sciences including Management Courses (H)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18LEH101J	English	2	0	2	3		
18LEH102J	Chinese						
18LEH103J	French						
18LEH104J	German	2	0	2	3		
18LEH105J	Japanese						
18LEH106J	Korean						
18PDH101T	General Aptitude	0	0	2	1		
18PDH102T	Management Principles for Engineers	2	0	0	2		
18PDH103T	Social Engineering	2	0	0	2		
18PDH201T	Employability Skills & Practices	0	0	2	1		
Total Learning Credits					12		
Basic Science Courses (B)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5		
18CYB101J	Chemistry	3	1	2	5		
18MAB101T	Calculus and Linear Algebra	3	1	0	4		
18MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4		
18MAB201T	Transforms and Boundary Value Problems	3	1	0	4		
18MAB202T	Numerical Methods for Engineers	3	1	0	4		
18MAB301T	Probability and Statistics	3	1	0	4		
18BTB101T	Biology	2	0	0	2		
Total Learning Credits					32		
Engineering Science Courses (S)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18MES101L	Engineering Graphics and Design	1	0	4	3		
18EES101J	Basic Electrical and Electronics Engineering	3	1	2	5		
18MES103L	Civil and Mechanical Engineering Workshop	1	0	4	3		
18CSS101J	Programming for Problem Solving	3	0	4	5		
18MHS201T	Thermodynamics and Heat Transfer	3	0	0	3		
Total Learning Credits					19		
Professional Core Courses (C)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18MHC101J	Mechanics of Solids and Fluids	3	0	2	4		
18MHC102T	Electrical Machines and Actuators	3	0	0	3		
18MHC103T	Solid State Devices and Circuits	3	0	0	3		
18MHC104L	Electrical and Electronics Laboratory	0	0	4	2		
18MHC105J	Fluid power system and Automation	3	0	2	4		
18MHC106T	Kinematics and Dynamics of Rigid Bodies and Mechanisms	3	1	0	4		
18MHC107T	System Dynamics	3	0	0	3		
18MHC108J	Digital Systems and Microprocessors	3	0	2	4		
18MHC201J	Linear and Digital Control Systems	3	0	2	4		
18MHC202J	Sensors and Signal Conditioning	3	0	2	4		
18MHC203J	Machine Design	3	0	2	4		
18MHC204T	Power Electronics and Drives	3	0	0	3		
18MHC205J	Microcontrollers and Embedded System	3	0	2	4		
18MHC301J	Manufacturing Processes	3	0	2	4		
18MHC302J	Design of Mechatronics System	3	0	2	4		
18MHC350T	Comprehension	0	1	0	1		
Total Learning Credits					55		
Project Work, Seminar, Internship In Industry / Higher Technical Institutions (P)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18MHP101L	Massive Open Online Course - I						
18MHP102L	Industrial Training-I	0	0	2	1		
18MHP103L	Seminar - I						
18MHP104L	Massive Open Online Course - II						
18MHP105L	Industrial Training-II	0	0	2	1		
18MHP106L	Seminar - II						
18MHP107L	Minor Project	0	0	6	3		
18MHP108L	Internship (4-6 weeks)						
18MHP109L	Project	0	0	20	10		
18MHP110L	Semester Internship						
Total Learning Credits					15		
Mandatory Courses (M)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18PDM101L	Professional Skills and Practices	0	0	2	0		
18PDM201L	Competencies in Social Skills						
18PDM203L	Entrepreneurial Skill Development	0	0	2	0		
18PDM202L	Critical and Creative Thinking Skills						
18PDM204L	Business Basics for Entrepreneurs	0	0	2	0		
18PDM301L	Analytical and Logical Thinking Skills						
18PDM302L	Entrepreneurship Management	0	0	2	0		
18LEM101T	Constitution of India	1	0	0	0		
18LEM102J	Value Education	1	0	1	0		
18GNM101L	Physical and Mental Health using Yoga	0	0	2	0		
18GNM102L	NSS						
18GNM103L	NCC	0	0	2	0		
18GNM104L	NSO						
18LEM109T	Indian Traditional Knowledge	1	0	0	0		
18LEM110L	Indian Art Form	0	0	2	0		
18CYM101T	Environmental Science	1	0	0	0		
Professional Elective Courses (E) (Any 6 Elective Courses)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18MHE401T	Elements of Mechatronics Systems	3	0	0	3		
18MHE402T	Fundamentals of Robotics	3	0	0	3		
18MHE403T	Industrial Instrumentation and Control	3	0	0	3		
18MHE404T	Industrial Automation	3	0	0	3		
18MHE405T	Manufacturing Information Systems	3	0	0	3		
18MHE406T	Industrial Electronics	3	0	0	3		
18MHE407T	Geometric Modelling	3	0	0	3		
18MHE408T	Micro Electro Mechanical Systems	3	0	0	3		
18MHE409T	Automation and Intelligent Systems	3	0	0	3		
18MHE410T	Virtual Instrumentation	3	0	0	3		
18MHE411T	Machine Vision and Image Processing	3	0	0	3		
18MHE412T	Advanced Control Systems	3	0	0	3		
18MHE413T	Industrial Programmable Controllers	3	0	0	3		
18MHE414T	Special Electrical Machines	3	0	0	3		
18MHE415T	Digital Manufacturing	3	0	0	3		
18MHE416T	Process Control Engineering	3	0	0	3		
18MHE417T	Applied Mechatronics Systems	3	0	0	3		
18MHE418T	Real Time Embedded Systems	3	0	0	3		
18MHE419T	Intelligent Control Systems	3	0	0	3		
18MHE420T	Intelligent Mechatronics Systems	3	0	0	3		
18MHE421T	Autonomous Mobile Robotics	3	0	0	3		
18MHE422T	Condition Monitoring Techniques	3	0	0	3		
18MHE423T	FPGA Based System Design	3	0	0	3		
18MHE424T	Design and Analysis of Algorithms	3	0	0	3		
18MHE425T	Advanced Microcontrollers and Signal Processors	3	0	0	3		
18MHE426T	Robot Kinematics and Dynamics	3	0	0	3		
18MHE427T	Systems Engineering	3	0	0	3		
Total Learning Credits					18		
Open Elective Courses (O)							
Course Code	Course Title	Hours/ Week				L	T
		P	C				
18MHO101T	Mechatronics	3	0	0	3		
18MHO102T	Model Based System Design	3	0	0	3		
18MHO103T	Introduction to Robotics	3	0	0	3		
Total Learning Credits					9		

### 31. (f) Program Articulation: B.Tech. in Mechatronics Engineering

Course Code	Course Name	Program Learning Outcomes (PLO)												
		Graduate Attributes											PSO	
		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1
														PSO - 2
														PSO - 3
18MHS201T	Thermodynamics and Heat Transfer	H	H	M	M	L	L	L	L	L	L	L	H	M
18MHC101J	Mechanics of Solids and Fluids	H	H	M	M	M	L	L	L	L	L	L	H	M
18MHC102T	Electrical Machines and Actuators	H	H	M	M	M	L	M	M	L	M	L	H	M
18MHC103T	Solid State Devices and Circuits	H	M	M	M	M	L	M	L	M	M	L	H	H
18MHC104L	Electrical and Electronics Laboratory	H	M	M	M	M	L	M	L	M	M	M	H	H
18MHC105J	Fluid power system and Automation	H	H	M	M	M	L	L	L	M	M	M	M	M
18MHC106T	Kinematics and Dynamics of Rigid Bodies and Mechanisms	H	H	H	M	L	L	L	M	L	M	H	L	H
18MHC107T	System Dynamics	H	H	M	H	M	L	M	M	L	L	M	H	M
18MHC108J	Digital Systems and Microprocessors	H	H	H	H	M	L	L	L	M	M	M	L	L
18MHC201J	Linear and Digital Control Systems	H	H	H	H	M	L	L	L	H	L	M	H	H
18MHC202J	Sensors and Signal Conditioning	H	H	M	H	M	L	M	M	L	L	M	H	M
18MHC203J	Machine Design	H	H	M	M	M	L	L	L	M	M	M	M	M
18MHC204T	Power Electronics and Drives	H	H	H	H	M	M	M	L	L	L	M	L	L
18MHC205J	Microcontrollers and Embedded System	H	H	H	H	M	L	M	L	H	L	M	H	M
18MHC301J	Manufacturing Processes	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHC302J	Design of Mechatronics System	H	H	M	M	H	H	H	L	M	L	L	H	M
18MHE401T	Elements of Mechatronics Systems	H	H	M	M	M	L	L	L	L	M	M	M	L
18MHE402T	Fundamentals of Robotics	H	H	M	M	M	L	L	L	M	M	M	M	M
18MHE403T	Industrial Instrumentation and Control	H	H	M	M	M	L	L	L	M	M	H	M	M
18MHE404T	Industrial Automation	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHE405T	Manufacturing Information Systems	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHE406T	Industrial Electronics	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHE407T	Geometric Modelling	H	H	H	H	M	M	H	M	M	M	H	H	M
18MHE408T	Micro Electro Mechanical Systems	H	H	H	H	L	M	H	L	L	L	L	H	M
18MHE409T	Automation and Intelligent Systems	H	H	H	H	M	L	L	L	L	L	M	M	M
18MHE410T	Virtual Instrumentation	H	H	H	H	M	M	H	L	L	L	L	H	M
18MHE411T	Machine Vision and Image Processing	H	H	H	H	M	L	L	L	M	M	M	M	M
18MHE412T	Advanced Control Systems	H	H	H	H	M	H	M	L	L	M	M	H	M
18MHE413T	Industrial Programmable Controllers	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHE414T	Special Electrical Machines	H	H	H	H	L	L	M	M	M	L	L	M	H
18MHE415T	Digital Manufacturing	H	H	H	H	M	L	H	L	M	L	H	H	H
18MHE416T	Process Control Engineering	H	H	M	H	M	L	L	L	M	M	M	H	M
18MHE417T	Applied Mechatronics Systems	H	H	M	H	H	L	M	M	L	L	M	H	M
18MHE418T	Real Time Embedded Systems	H	M	M	M	M	L	M	L	M	M	M	H	H
18MHE419T	Intelligent Control Systems	H	H	M	M	M	L	M	L	L	L	M	H	H
18MHE420T	Intelligent Mechatronics Systems	H	H	H	H	M	M	H	L	L	L	L	H	M
18MHE421T	Autonomous Mobile Robotics	H	H	M	H	L	L	M	L	L	L	L	H	M
18MHE422T	Condition Monitoring Techniques	H	L	L	L	L	M	M	L	L	L	M	M	H
18MHE423T	FPGA Based System Design	H	H	L	L	L	L	M	L	H	M	L	H	H
18MHE424T	Design and Analysis of Algorithms	H	H	M	M	L	L	L	L	L	L	L	H	M
18MHE425T	Advanced Microcontrollers and Signal Processors	H	H	H	H	H	M	M	L	M	L	M	H	H
18MHE426T	Robot Kinematics and Dynamics	H	H	M	M	M	L	L	L	M	M	M	M	M
18MHE427T	Systems Engineering	H	H	M	M	M	L	L	L	M	M	M	M	M
18MHP101L	Massive Open Online Course - I	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP102L	Industrial Training-I	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP103L	Seminar - I	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP104L	Massive Open Online Course - II	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP105L	Industrial Training-II	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP106L	Seminar - II	H	M	M	M	M	M	M	M	H	H	H	M	H
18MHP107L	Minor Project	H	H	H	H	H	M	M	H	H	H	H	H	M
18MHP108L	Internship (4-6 weeks)	H	H	H	H	H	M	M	H	H	H	H	H	M
18MHP109L	Project	H	H	H	H	H	M	M	H	H	H	H	H	M
18MHP110L	Semester Internship	H	H	H	H	H	M	M	H	H	H	H	H	M
	Program Average	H	H	M	H	M	L	M	L	M	M	M	H	M

### 31. (g) Implementation Plan: B.Tech. in Mechatronics Engineering

Semester - I					
Code	Course Title	Hours/ Week			C
		L	T	P	
18LEH10XJ	Chinese / French / German / Japanese/ Korean	2	0	2	3
18MAB101T	Calculus and Linear Algebra	3	1	0	4
18CYB101J	Chemistry	3	1	2	5
18CSS101J	Programming for Problem Solving	3	0	4	5
18MES103L	Civil and Mechanical Engineering Workshop	1	0	4	3
18PDM101L	Professional Skills and Practices	0	0	2	0
18LEM102J	Value Education	1	0	1	0
18GNM102L	NSS	0	0	2	0
18GNM103L	NCC				
18GNM104L	NSO				
Total Learning Credits					20

Semester - II					
Code	Course Title	Hours/ Week			C
		L	T	P	
18LEH101J	English	2	0	2	3
18MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
18PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
18MES101L	Engineering Graphics and Design	1	0	4	3
18EES101J	Basic Electrical and Electronics Engineering	3	1	2	5
18PDH101T	General Aptitude	0	0	2	1
18LEM101T	Constitution of India	1	0	0	0
18GNM101L	Physical and Mental Health using Yoga	0	0	2	0
Total Learning Credits					21

Semester - III					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MAB201T	Transforms and Boundary Value Problems	3	1	0	4
18MHS201T	Thermodynamics and Heat Transfer	3	0	0	3
18MHC101J	Mechanics of Solids and Fluids	3	0	2	4
18MHC102T	Electrical Machines and Actuators	3	0	0	3
18MHC103T	Solid State Devices and Circuits	3	0	0	3
18MHC104L	Electrical and Electronics Laboratory	0	0	4	2
18PDH103T	Social Engineering	2	0	0	2
18PDM201L	Competencies in Social Skills	0	0	2	0
18PDM203L	Entrepreneurial Skill Development				
18CYM101T	Environmental Science				
Total Learning Credits					21

Semester - IV					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MAB202T	Numerical Methods for Engineers	3	1	0	4
18BTB101T	Biology	2	0	0	2
18MHC105J	Fluid power system and Automation	3	0	2	4
18MHC106T	Kinematics and Dynamics of Rigid Bodies and Mechanisms	3	1	0	4
18MHC107T	System Dynamics	3	0	0	3
18MHC108J	Digital Systems and Microprocessors	3	0	2	4
18PDH102T	Management Principles for Engineers	2	0	0	2
18PDM202L	Critical and Creative Thinking Skills	0	0	2	0
18PDM204L	Business Basics for Entrepreneurs				
Total Learning Credits					23

Semester - V					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MAB301T	Probability and Statistics	3	1	0	4
18MHC201J	Linear and Digital Control Systems	3	0	2	4
18MHC202J	Sensors and Signal Conditioning	3	0	2	4
	Professional Elective – 1	3	0	0	3
	Professional Elective – 2	3	0	0	3
	Professional Elective – 3	3	0	0	3
	Open Elective – 1	3	0	0	3
18MHP101L	Massive Open Online Course - I	0	0	2	1
18MHP102L	Industrial Training-I				
18MHP103L	Seminar - I				
18PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
18PDM302L	Entrepreneurship Management				
18LEM110L	Indian Art Form	0	0	2	0
Total Learning Credits					25

Semester - VI					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MHC203J	Machine Design	3	0	2	4
18MHC204T	Power Electronics and Drives	3	0	0	3
18MHC205J	Microcontrollers and Embedded System	3	0	2	4
18MHC350T	Comprehension	0	1	0	1
	Professional Elective – 4	3	0	0	3
	Professional Elective – 5	3	0	0	3
	Open Elective – 2	3	0	0	3
18MHP104L	Massive Open Online Course - II	0	0	2	1
18MHP105L	Industrial Training-II				
18MHP106L	Seminar - II				
18PDH201T	Employability Skills and Practices	0	0	2	1
18LEM109T	Indian Traditional Knowledge	1	0	0	0
Total Learning Credits					23

Semester - VII					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MHC301J	Manufacturing Processes	3	0	2	4
18MHC302J	Design of Mechatronics System	3	0	2	4
	Professional Elective – 6	3	0	0	3
	Open Elective – 3	3	0	0	3
18MHP107L	Minor Project	0	0	6	3
18MHP108L	Internship (4-6 weeks)				
Total Learning Credits					17

Semester - VIII					
Code	Course Title	Hours/ Week			C
		L	T	P	
18MHP109L	Project	0	0	20	10
18MHP110L	Semester Internship				
Total Learning Credits					10