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 2023)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

3. B.Tech. in Automation and Robotics

3. (a) Mission of the Department

Mission Stmt – 1	*To have a scholarly and professional environment to make long lasting contributions for the advancement of knowledge.*
Mission Stmt – 2	*To foster research and development for the benefit of global community.*
Mission Stmt – 3	*To have an innovative, dynamic, flexible devising academic program and structure.*

3. (b) Program Educational Objectives (PEO)

PEO – 1	*Graduates will be able to take up career in robotics and automation of industrial process with environment protection and safety concern.*
PEO – 2	*Graduates will be able to solve technical problems to serve the society in a responsible and ethical manner.*
PEO – 3	*Graduates will be able to serve the end users with cutting edge technologies to meet industry standards*
PEO – 4	*Graduates will be able to achieve broad and in-depth knowledge of automation and robotics to practice and pursue higher studies*
PEO – 5	*Graduates will be able to work as a team on multidisciplinary projects and excel in their career*

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

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3
PEO - 1	*3*	*2*	*3*
PEO - 2	*3*	*1*	*3*
PEO - 3	*1*	*1*	*2*
PEO - 4	*2*	*3*	*3*
PEO - 5	*2*	*3*	*3*

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

3. (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	*3*	*2*	*3*	-	*3*	*2*	*3*	*2*	*2*	*2*	*2*	*3*	*3*	*2*	*3*
PEO - 2	*3*	*3*	*2*	*3*	*2*	*3*	*2*	*3*	*2*	*2*	-	-	*2*	*2*	*3*
PEO - 3	*3*	*3*	*2*	*1*	*3*	-	-	*3*	-	*3*	*3*	-	*3*	*2*	*3*
PEO - 4	*3*	*2*	*3*	*2*	*1*	-	-	*2*	-	*2*	-	*3*	*1*	*3*	*1*
PEO - 5	*3*	*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*	*3*	*2*	*3*	*2*

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

PSO – Program Specific Outcomes (PSO)

PSO - 1	*Design and develop a suitable control methodology for an industrial process automation system.*
PSO - 2	*Apply the knowledge gained on robotics through the process of design, development, and implementation of automation system.*
PSO - 3	*Undertake higher education, research and entrepreneurship in the field of automation and robotics.*

3. (e) Program Structure: B.Tech. in Automation and Robotics 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	2	1	0	3
21LEH103T	French				
21LEH104T	German				
21LEH105T	Japanese				
21LEH106T	Korean				
21LEH107T	Spanish				
21GNH101J	Philosophy of Engineering	1	0	2	2
21GNH401T	Behavioral Psychology	2	1	0	3
21PDH201T	Social Engineering	2	0	0	2
				Total Credits	13

Engineering Science Courses (S)

Course Code	Course Title	Hours / Week L	T	P	C
21MES101L	Basic Civil and Mechanical Workshop	0	0	4	2
21MES102L	Engineering Graphics and Design	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21DCS201P	Design Thinking and Methodology	1	2	0	3
21CSS101J	Programming for Problem Solving	3	0	2	4
21EIS204T	Industrial Data Communication	3	0	0	3
21CSS303T	Data Science	2	0	0	2
				Total Credits	20

Open Elective Courses (O)
(Any 3 Courses)

Course Code	Course Title	Hours / Week L	T	P	C
21EIO131J	Virtual Instrumentation	2	0	2	3
21EIO132T	Analytical Instrumentation	3	0	0	3
21EIO133T	Industrial Automation Systems	3	0	0	3
21EIO134T	Introduction to Sensors	3	0	0	3
21EIO135T	Introduction to MEMS	3	0	0	3
21EIO136J	PLC for Industrial Automation	2	0	2	3
21EIO138T	Logical Foundations of Cyber-Physical Systems	3	0	0	3
				Total Credits	09

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

Course Code	Course Title	Hours / Week L	T	P	C
21GNP301L	Community Connect	0	0	2	1
21EIP302L	Project	0	0	6	3
21EIP303T	MOOC	3	0	0	
21EIP401L	Major Project	0	0	30	15
21EIP402L	Major Project	0	0	20	10
21EIP403L	Internship#	0	0	10	5
				Total Credits	19

Basic Science Courses (B)

Course Code	Course Title	Hours / Week L	T	P	C
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21CYB101J	Chemistry	3	1	2	5
21MAB101T	Calculus and Linear Algebra	3	1	0	4
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4
21MAB203T	Probability and Stochastic Processes	3	1	0	4
21BTB103T	Biology	2	0	0	2
				Total Credits	28

Professional Core Courses (C)

Course Code	Course Title	Hours / Week L	T	P	C
21EIC101J	Sensors and Actuators	3	0	2	4
21EIC205J	Analog Integrated Circuits	3	0	2	4
21EIC206J	Control Systems Design and Analysis	3	0	2	4
21EIC211J	Hydraulics and Pneumatics	3	0	2	4
21EIC212J	Fundamentals of Industrial Robotics	2	0	2	3
21EIC213J	PLC and HMI Programming	3	0	2	4
21EIC301P	Embedded System Design	2	0	4	4
21EIC302J	Process Control	3	0	2	4
21EIC305P	Factory Automation	2	0	4	4
21EIC311T	Power Electronics and Drives	3	0	0	3
21EIC312J	VFD and Servo Programming	2	0	2	3
21EIC313T	Robot Kinematics and Dynamics	3	0	0	3
21EIC411T	Autonomous Mobile Robotics	3	0	0	3
21EIC412J	Robotics for Industrial Automation	2	0	2	3
21CSC206T	Artificial Intelligence	2	1	0	3
				Total Credits	53

Non Credit Courses (M)

Course Code	Course Title	Hours / Week L	T	P	C
21PDM101L	Professional Skills and Practices	0	0	2	0
21PDM102L	General Aptitude	0	0	2	0
21PDM201L	Verbal Reasoning	0	0	2	0
21PDM202L	Critical and Creative Thinking Skills	0	0	2	0
21PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
21PDM302L	Employability Skills and Practices	0	0	2	0
21CYM101T	Environmental Science	1	0	0	0
21LEM101T	Constitution of India	1	0	0	0
21LEM102T	Universal Human Values – Introduction	1	0	0	0
21LEM201T	Professional Ethics	1	0	0	0
21LEM202T	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3
21LEM301T	Indian Art Form	1	0	0	0
21LEM302T	Indian Traditional Knowledge	1	0	0	0
21GNM101L	Physical and Mental Health using Yoga	0	0	2	0
21GNM102L	National Service Scheme				
21GNM103L	National Cadet Corps				
21GNM104L	National Sports Organization				
				Total Credits	03

Professional Elective Courses (E) *(Any 6 Courses)*					
Course Code	Course Title	Hours / Week			C
		L	T	P	
Sub-stream: Manufacturing					
21EIE201T	*Reliability and Safety Engineering*	*3*	*0*	*0*	*3*
21EIE203T	*Fundamental of MEMS*	*3*	*0*	*0*	*3*
21EIE251T	*Bio medical Instrumentation*	*3*	*0*	*0*	*3*
21EIE301T	*Building Automation System*	*3*	*0*	*0*	*3*
21EIE303T	*Automotive Sensors and Smart Systems*	*3*	*0*	*0*	*3*
21EIE306T	*Industrial Internet of Things*	*3*	*0*	*0*	*3*
21EIE307T	*Modern Control Techniques*	*3*	*0*	*0*	*3*
21EIE309T	*E-Vehicle Technology*	*3*	*0*	*0*	*3*
21EIE310T	*Intelligent Systems and Control*	*3*	*0*	*0*	*3*
21EIE312T	*Industrial Processes and Control*	*3*	*0*	*0*	*3*

Professional Elective Courses (E)					
Course Code	Course Title	Hours / Week			C
		L	T	P	
21EIE313T	*Deep Learning Techniques*	*3*	*0*	*0*	*3*
21EIE351T	*Wireless Sensor Networks*	*3*	*0*	*0*	*3*
21EIE401T	*Cyber Security for Industrial Automation*	*3*	*0*	*0*	*3*
21EIE403T	*Multisensor and Decision Systems*	*3*	*0*	*0*	*3*
21EIE407T	*Machine Vision Systems*	*3*	*0*	*0*	*3*
21EIE411T	*Virtual and Augmented Reality*	*3*	*0*	*0*	*3*
21EIE451J	*Image Processing for Robotics*	*2*	*0*	*2*	*3*
21EIE452T	*Industrial Data Communication Networks*	*3*	*0*	*0*	*3*
21EIE455T	*Robot Programming*	*3*	*0*	*0*	*3*
21EIE456T	*Machine Learning and Data Analytics*	*3*	*0*	*0*	*3*
				Total Credits	**18**

3. (f) Programme Articulation: B.Tech. in Automation and Robotics Engineering

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
21EIC101J	Sensors and Actuators	2.6	2	-	-	-	-	-	-	-	-	-	-	-	2	-
21EIC205J	Analog Integrated Circuits	3	1.7	-	2	-	-	-	-	-	-	-	-	-	1.6	-
21EIC206J	Control Systems Design and Analysis	2.8	-	-	2	2	-	-	-	-	-	-	-	2.2	-	-
21EIC211J	Hydraulics and Pneumatics	3	-	2	-	-	-	-	-	-	-	-	-	2	1.3	-
21EIC212J	Fundamentals of Industrial Robotics	3	-	-	-	-	-	-	-	-	-	-	-	-	3	1
21EIS204T	Industrial Data Communication	3	1.4	-	-	-	-	-	-	-	-	-	-	-	1.4	-
21EIC213J	PLC and HMI Programming	3	-	2	-	3	-	-	-	-	-	-	-	1.6	-	-
21EIC301P	Embedded System Design	2	2	3	3	-	-	-	-	3	-	-	-	2	3	-
21EIC302J	Process Control	2	2	2	-	-	-	-	-	-	-	-	-	2.8	-	-
21EIC305P	Factory Automation	3	-	2	1	-	-	-	-	-	-	-	-	3	-	-
21EIC311T	Power Electronics and Drives	3	-	2	2	-	-	-	-	-	-	-	-	1.3	-	-
21EIC312J	VFD and Servo Programming	3	-	1	-	3	-	-	-	-	-	-	-	3	3	-
21EIC313T	Robot Kinematics and Dynamics	3	3	-	-	-	-	-	-	-	-	-	-	-	2	-
21EIC411T	Autonomous Mobile Robotics	3	3	-	2	-	-	-	-	-	-	-	-	-	3	-
21EIC412J	Robotics for Industrial Automation	3	2	-	-	-	-	-	-	-	-	-	-	-	3	-
21EIE201T	Reliability and Safety Engineering	2.8	-	2.2	-	-	-	-	-	-	-	-	-	-	-	3
21EIE203T	Fundamental of MEMS	3	-	2	-	-	-	-	-	-	-	-	-	-	2	-
21EIE251T	Biomedical Instrumentation	3	2.7	2.5	2.25	-	-	-	-	-	-	-	-	1	-	-
21EIE301T	Building Automation System	3	-	2	-	-	-	-	-	-	-	-	-	-	3	3
21EIE303T	Automotive Sensors and Smart Systems	3	-	2.3	-	-	-	-	-	-	-	-	-	1.5	2.5	3
21EIE306T	Industrial Internet of Things	3	-	-	2	-	-	-	-	-	-	-	-	-	3	-
21EIE307T	Modern Control Techniques	2	-	2	2	-	-	-	-	-	-	-	-	3	-	-
21EIE309T	E-Vehicle Technology	2	-	2	2	-	-	-	-	-	-	-	-	-	-	2
21EIE310T	Intelligent Systems and Control	3	-	2	-	-	-	-	-	-	-	-	-	1.8	-	-
21EIE312T	Industrial Processes and Control	2.8	2	2	-	1	-	-	-	-	-	-	2	-	2	-
21EIE313T	Deep Learning Techniques	2.8	-	-	2.2	1	-	-	-	-	-	-	-	-	-	3
21EIE351T	Wireless Sensor Networks	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-
21EIE401T	Cyber Security for Industrial Automation	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-
21EIE403T	Multisensor and Decision Systems	3	-	-	2.2	1	-	-	-	-	-	-	-	-	-	3
21EIE407T	Machine Vision Systems	2.8	-	3	-	1	-	-	-	-	-	-	-	1	-	-
21EIE411T	Virtual and Augmented Reality	2	-	3	-	-	-	-	-	-	-	-	-	-	-	2
21EIE451J	Image Processing for Robotics	2.8	-	1.6	-	-	-	-	-	-	-	-	-	-	3	3
21EIE455T	Robot Programming	2	-	3	-	-	-	-	-	-	-	-	-	-	-	3
21EIE456T	Machine Learning and Data Analytics	3	-	2	-	-	-	-	-	-	-	-	-	3	-	-
21GNP301L	Community Connect	3	2	2	-	3	-	-	3	3	3	-	-	1.6	1	1.6
21EIP302L	Project	3	3	2	2.5	3	2.7	3	2	3	3	3	2	1.4	2	2
21EIP303T	MOOC	3	2	2	-	-	-	-	-	2	3	-	-	1.4	1	1.8
21EIP401L / 21EIP402L	Major Project	3	3	2	2.5	3	2.7	3	2	3	3	3	2	1.4	2	2
21EIP403L	Internship	3	2	2	-	-	-	-	-	3	3	3	2.2	1.6	1.2	1.8
Program Average		2.7	2.2	2.3	2.1	2.1	2.7	3	2.3	2.8	3	3	2.0	1.9	2.1	2.3

3. (g) Implementation Plan: B.Tech. in Automation and Robotics Engineering

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
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21MES102L	Engineering Graphics and Design	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21CYM101T	Environmental Science*	1	0	0	0
21PDM101L	Professional Skills and Practices	0	0	2	0
21LEM101T	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				
21GNH101J	Philosophy of Engineering	1	0	2	2
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21CYB101J	Chemistry	3	1	2	5
21BTB103T	Biology	2	0	0	2
21CSS101J	Programming for Problem Solving	3	0	2	4
21EIC101J	Sensors and Actuators	3	0	2	4
21MES101L	Basic Civil and Mechanical Workshop	0	0	4	2
21PDM102L	General Aptitude*	0	0	2	0
21GNM101L	Physical and Mental Health using Yoga	0	0	2	0
21GNM102L	National Service Scheme				
21GNM103L	National Cadet Corps				
21GNM104L	National Sports Organization				
				Total Credits	26

Semester - III

Course Code	Course Title	Hours / Week L	T	P	C
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4
21EIC205J	Analog Integrated Circuits	3	0	2	4
21EIC211J	Hydraulics and Pneumatics	3	0	2	4
21EIC212J	Fundamentals of Industrial Robotics	2	0	2	3
21EIS204T	Industrial Data Communication	3	0	0	3
21PDH201T	Social Engineering	2	0	0	2
21LEM201T	Professional Ethics	1	0	0	0
21PDM201L	Verbal Reasoning	0	0	2	0
21LEM202T	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3
				Total Credits	23

Semester - IV

Course Code	Course Title	Hours / Week L	T	P	C
21MAB203T	Probability and Stochastic Processes	3	1	0	4
21CSC206T	Artificial Intelligence	2	1	0	3
21EIC206J	Control Systems Design and Analysis	3	0	2	4
21EIC213J	PLC and HMI Programming	3	0	2	4
	Professional Elective-I				3
21DCS201P	Design Thinking and Methodology	1	2	0	3
21PDM202L	Critical and Creative Thinking Skills	0	0	2	0
				Total Credits	21

Semester - V

Course Code	Course Title	Hours / Week L	T	P	C
21EIC301P	Embedded System Design	2	0	4	4
21EIC302J	Process Control	3	0	2	4
21EIC313T	Robot Kinematics and Dynamics	3	0	0	3
21EIC311T	Power Electronics and Drives	3	0	0	3
	Professional Elective – II				3
	Open Elective – I				3
21GNP301L	Community Connect	0	0	2	1
18PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
21LEM301T	Indian Art Form	1	0	0	0
				Total Credits	21

Semester - VI

Course Code	Course Title	Hours / Week L	T	P	C
21CSS303T	Data Science	2	0	0	2
21EIC305P	Factory Automation	2	0	4	4
21EIC312J	VFD and Servo Programming	2	0	2	3
E	Professional Elective – III				3
E	Professional Elective – IV				3
21EIP302L	Project	0	0	6	3
21EIP303T	MOOC	3	0	0	
O	Open Elective – II				3
21PDM302L	Employability Skills and Practices	0	0	2	0
21LEM302T	Indian Traditional Knowledge	1	0	0	0
				Total Credits	21

Semester - VII

Course Code	Course Title	Hours / Week L	T	P	C
21GNH401T	Behavioral Psychology	2	1	0	3
21EIC411T	Autonomous Mobile Robotics	3	0	0	3
21EIC412J	Robotics for Industrial Automation	2	0	2	3
	Professional Elective-V				3
	Professional Elective-VI				3
	Open Elective-III				3
				Total Credits	18

Semester - VIII

Course Code	Course Title	Hours / Week L	T	P	C
21EIP401L	Major Project	0	0	30	15
21EIP402L	Major Project	0	0	20	10
21EIP403L	Internship#	0	0	10	5
				Total Credits	15

#Students have to register either 21EIP401L or 21EIP402L and 21EIP403L 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