B. Tech in Automation and Robotics

2021 Regulations

Curriculum

Department of Electronics and Instrumentation Engineering
College of Engineering and Technology
SRM Institute of Science and Technology
SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

1. B. Tech in Automation and Robotics

(Industry supported)

1. (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.

1. (b) Program Educational Objectives (PEO)

The Program Educational Objectives for the Automation and Robotics program describe accomplishments that graduates are expected to attain within five years after graduation. Graduates within 5 years of graduation will / should demonstrate:

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
PEO – 6	Graduates will be adaptable to diverse working environment, possess good communication skills and leadership quality to solve problems globally

1. (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
PEO - 6	3	3	3

1. (d) Mapping Program Educational Objectives (PEO) to Program Outcomes (PO)

	Program Outcomes (PO)														
	Graduate Attributes (GA)												**Program Specific Outcomes (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	Model a system and design a control methodology	Design, develop and implement Automation System.	Utilize the modern computational tools
PEO - 1	3	2	3		3	2	3	2	2	2	2	3	3	2	3
PEO - 2	3	3	2	3	2	3	-	3	2	2	-	-	2	2	3
PEO - 3	-	3	2	2	3	-	-	3	-	3	3	-	3	2	3
PEO - 4	3	-	3	2	-	-	-	2	-	2	-	3	1	3	1
PEO - 5	-	3	3	3	-	1	-	2	3	3	3	3	2	3	2
PEO - 6	-	3	-	-	-	2	3	2	3	3	3	-	2	3	1

Program Specific Outcomes (PSO)

Graduates of baccalaureate degree program in Automation and Robotics must demonstrate knowledge and hands-on competence in the ability to:

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	Utilize the modern computational tools in the field of automation and robotic system to assess its effect on societal, environmental and industrial safety

1. (e) Program Structure for B.Tech in Automation and Robotics

1. 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 Language	2	1	0	3
21LEH103T	French Language				
21LEH104T	German Language				
21LEH105T	Japanese Language				
21LEH106T	Korean Language				
21LEH107T	Spanish Language				
21GNH101J	Philosophy of Engineering	1	0	1	2
21GNH401T	Behavioural Psychology	2	1	0	3
21PDH201T	Social Engineering	2	0	0	2
Total Learning Credits					**13**

2. 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
21BTB101T	Biology	2	0	0	2
Total Learning Credits					**28**

3. Engineering Science Courses (S)

Course Code	Course Title	Hours/ Week L	T	P	C
21MES101L/ 21MES102L	Basic Civil and Mechanical Workshop/ Engineering Graphics and Design	0	0	4	2
21MES102L/ 21MES101L	Engineering Graphics and Design/ Basic Civil and Mechanical Workshop	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21DCS201P	Design Thinking& Methodology (Fully Internal assessment and evaluation)	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 Learning Credits				**20**

4. 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
21EIC212T	Principles of Industrial Robotics	3	0	0	3
21EIC213J	PLC and HMI Programming	3	0	2	4
21EIC301J	Embedded System Design	3	0	2	4
21EIC302J	Process Control	3	0	2	4
21EIC304T	Industrial Instrumentation	3	0	0	3
21EIC305J	Industrial Process Automation Systems	3	0	2	4
21EIC311T	Power Electronics and Drives	3	0	0	3
21EIC312J	VFD and Servo Programming	2	0	2	3
21EIC411J	Image Processing for Robotics	2	0	2	3
21EIC412J	Robotics for Industrial Automation	2	0	2	3
21CSC206T	Artificial Intelligence	2	1	0	3
	Total Learning Credits				**53**

5. Professional Elective Courses (E)

Course Code	Course Title	Hours/ Week L	T	P	C
	Professional Elective – 1	3	0	0	3
	Professional Elective – 2	3	0	0	3
	Professional Elective – 3	3	0	0	3
	Professional Elective – 4	3	0	0	3
	Professional Elective – 5	3	0	0	3
	Professional Elective – 6	3	0	0	3
	Total Learning Credits				**18**

6. Open Elective Courses (O)

Course Code	Course Title	Hours/ Week L	T	P	C
	Open Elective – 1	3	0	0	3
	Open Elective – 2	3	0	0	3
	Open Elective – 3	3	0	0	3
	Total Learning Credits				**9**

7. Project Work, Seminar, Internship In Industry / Higher Technical Institutions (P)

Course Code	Course Title	Hours/ Week L	T	P	C
21EIP321L	Community Connect (To be completed in 4th sem vacation)	0	0	2	1
21EIP322L/ 21EIP323L	Project (compulsory for exit option at 6th semester) / MOOC	0/3	0/0	6/0	3
21EIP421L	Major Project	0	0	30	15
21EIP422L	Semester Internship				
Total Learning Credits					**19**

8. Mandatory Courses (M)

Course Code	Course Title	Hours/ Week L	T	P	C
21PDM101L	Professional Skills & 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
21LEM201T	Professional Ethics	1	0	0	0
21CYM101T	Environmental Science	1	0	0	0
Total Learning Credits					**0**

List of Professional Elective Courses (E)
Any 6 Courses

Course Code	Course Title	Hours/ Week L	T	P	C
21EIE201T	Reliability and Safety Engineering	3	0	0	3
21EIE203T	Fundamental of MEMS	3	0	0	3
21EIE251T	Biomedical 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
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	Multi-sensor and Decision Systems	3	0	0	3
21EIE407T	Machine Vision Systems	3	0	0	3
21EIE411T	Virtual and Augmented Reality	3	0	0	3
21EIE451T	Industrial Robotics and Material Handling Systems	3	0	0	3
21EIE455T	Algorithm for Intelligent Systems and Robotics	3	0	3	3
21EIE456T	Machine Learning and Data Analytics	3	0	0	3

List of 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

1. (f) Program Articulation (B.Tech in Automation and Robotics)

Course Code	Course Name	Program Outcomes (PO)													
		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	Model a system and design a control methodology	Design, develop and implement Automation System.	Utilize the modern computational tools
21EES101T	Electrical and Electronics Engineering	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
21MES101L	Basic Civil and Mechanical Workshop	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
21EIS204T	Industrial Data Communication	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-
21EIC101J	Sensors and Actuators	2	1	1	-	-	-	-	-	-	-	-	-	-	-	1
21EIC205J	Analog Integrated Circuits	2	1	-	-	-	-	-	-	-	-	-	-	1	-	-
21EIC206J	Control Systems Design and Analysis	3	-	-	2	-	-	-	-	-	-	-	-	3	-	-
21EIC211J	Hydraulics and Pneumatics	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-
21EIC212T	Principles of Industrial Robotics	3	3	-	2	-	-	-	-	-	-	-	-	1	-	-
21EIC213J	PLC & HMI Programming	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
21EIC301J	Embedded System Design	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
21EIC302J	Process Control	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
21EIC304T	Industrial Instrumentation	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
21EIC305J	Industrial Process Automation Systems	3	3	2	-	-	-	-	-	-	-	-	-	3	-	-
21EIC311T	Power Electronics and Drives	2	-	2	2	-	-	-	-	-	-	-	-	-	2	-
21EIC312J	VFD and Servo Programming	2	1	1	-	-	-	-	-	-	-	-	-	3	3	-
21EIC411J	Image Processing for Robotics	3	-	2	-	-	-	-	-	-	-	-	-	3	-	-
21EIC412J	Robotics for Industrial Automation	2	2	-	-	-	-	-	-	-	-	-	-	2	-	-
21EIP321L	Community Connect (To be completed in 4th sem vacation)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21EIP322L/ 21EIP323L	Project (compulsory for exit option at 6th semester) / MOOC	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21EIP421L/ 21EIP422L	Major Project / Semester Internship	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

PSO – Program Specific Outcomes (PSO)

1. (g) Implementation Plan (B. Tech- Automation and Robotics)

Semester - I

Code	Course Title	Hours/ Week L	T	P	C
21LEH102T/ 21LEH103T/ 21LEH104T/ 21LEH105T/ 21LEH106T/ 21LEH107T	Chinese Language / French Language / German Language / Japanese Language/ Korean Language / Spanish Language	2	1	0	3
21GNH101J	Philosophy of Engineering	1	0	1	2
21MAB101T	Calculus and Linear Algebra	3	1	0	4
21CYB101J	Chemistry	3	1	2	5
21BTB101T	Biology	2	0	0	2
21CSS101J	Programming for Problem Solving	3	0	2	4
21MES101L/ 21MES102L	Basic Civil and Mechanical Workshop / Engineering Graphics and Design	0	0	4	2
21PDM101L	Professional Skills and Practices	0	0	2	0
Total Learning Credits					22

Semester – II

Code	Course Title	Hours/ Week L	T	P	C
21LEH101T	Communicative English	2	1	0	3
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21MES102L/ 21MES101L	Engineering Graphics and Design/ Basic Civil and Mechanical Workshop	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21PDH102L	General Aptitude	0	0	2	0
21CYM101T	Environmental Science	1	0	0	0
21EIC101J	Sensors and Actuators	3	0	2	4
Total Learning Credits					22

Semester - III

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
21EIC212T	Principles of Industrial Robotics	3	0	0	3
21DCS201P	Design Thinking & Methodology (Fully Internal assessment and evaluation)	1	2	0	3
21EIS204T	Industrial Data Communication	3	0	0	3
21LEM201T	Professional Ethics	1	0	0	0
21PDM201L	Verbal Reasoning	0	0	2	0
Total Learning Credits					21

Semester - IV

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-1	3	0	0	3
21PDH201T	Social Engineering	2	0	0	2
21PDM202L	Critical and Creative Thinking Skills	0	0	2	0
Total Learning Credits					20

Semester - V

Code	Course Title	Hours/ Week L	T	P	C
21EIC301J	Embedded System Design	3	0	2	4
21EIC302J	Process Control	3	0	2	4
21EIC304T	Industrial Instrumentation	3	0	0	3
21EIC311T	Power Electronics and Drives	3	0	0	3
	Professional Elective – 2	3	0	0	3
	Open Elective – 1	3	0	0	3
21EIP321L	Community Connect (To be completed in 4th sem vacation)	0	0	2	1
18PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
Total Learning Credits					21

Semester - VI

Code	Course Title	Hours/ Week L	T	P	C
21CSS303T	Data Science	2	0	0	2
21EIC305J	Industrial Process Automation Systems	3	0	2	4
21EIC312J	VFD and Servo Programming	2	0	2	3
	Professional Elective-3	3	0	0	3
	Professional Elective-4	3	0	0	3
	Open Elective-2	3	0	0	3
21EIP322L / 21EIP323L	Project (compulsory for exit option at 6th semester) / MOOC	0/3	0/0	6/0	3
21PDH302L	Employability Skills and Practices	0	0	2	0
Total Learning Credits					21

Semester - VII

Code	Course Title	Hours/ Week L	T	P	C
21GNH401T	Behavioural Psychology	2	1	0	3
21EIC411J	Image Processing for Robotics	2	0	2	3
21EIC412J	Robotics for Industrial Automation	2	0	2	3
	Professional Elective-5	3	0	0	3
	Professional Elective-6	3	0	0	3
	Open Elective-3	3	0	0	3
Total Learning Credits					18

Semester - VIII

Code	Course Title	Hours/ Week L	T	P	C
21EIP421L/ 21EIP422L	Major Project / Semester Internship	0	0	30	15
Total Learning Credits					15