ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMMES

Bachelor of Technology

(B.Tech. - Four Years)

(New Programmes)

Regulations 2018

Volume – 4(10)

(Revised in March 2019)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Kancheepuram District 603203, Tamil Nadu, India

6. B.Tech in Electronics and Communication Engineering (with specialization in Cyber Physical System)

6. (a) Mission of the Department

Mission Stmt - 1	Build an educational process that is well suited to local needs as well as satisfies the international accreditation requirements.
Mission Stmt - 2	Attract the qualified professionals and retain them by building an environment that foster work freedom and empowerment.
Mission Stmt - 3	With the right talent pool, create knowledge and disseminate, get involved in collaborative research with reputed institutes, and produce competent graduands.

6. (b) Program Educational Objectives (PEO)

The Program Educational Objectives for the Electronics and Communication Engineering (with specialization in Cyber Physical System) 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	**Expertise** using their mathematical and scientific knowledge to solve emerging real-world problems, design and **create** novel products and solutions related to **Cyber Physical System (CPS)** design, that are technically sound, economically feasible and socially acceptable besides categorizing the essential modeling formalisms of **CPS**. Analyze and verify the correctness of **CPS** implementations against system requirements and timing constraints.
PEO – 2	Broad knowledge to **establish** themselves as **creative** practicing professionals, locally and globally, in fields such as design, research, testing and manufacturing of **CPS**. Analyze the serviceable compartment of **CPS** based on standard demonstrating formalisms and design **CPS** requirements based on operating system and hardware architecture constraints.
PEO – 3	Communication skills (in both written and oral forms) and critical reasoning skills in **bridging** the divide between advanced technology and end users in the practice of Instrumentation Engineering.
PEO – 4	Sustained **learning** and adapting to a constantly changing field through graduate work, professional development, self-study and collaborative activities.
PEO – 5	**Leadership** and initiative to ethically advance professional and organizational goals, facilitate the achievements of others, and obtain substantive results.
PEO – 6	Ability to work productively as individuals and in groups (**teamwork / collaborative work**) of diverse cultural and multidisciplinary backgrounds.

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

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3
PEO - 1	L	M	H
PEO - 2	H	L	H
PEO - 3	L	L	M
PEO - 4	M	L	M
PEO - 5	L	H	H
PEO - 6	H	H	H

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

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

	Program Learning Outcomes (PLO)														
	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	PSO - 1	PSO - 2	PSO - 3
PEO - 1	H		H			H	M	H			H		H		H
PEO - 2		H	M	H	M									H	M
PEO - 3					L			M		H			L	L	M
PEO - 4												H	M		
PEO - 5						L			M						M
PEO - 6						M			H						M

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

Program Specific Outcomes (PSO) Graduates of baccalaureate degree program in ECE with **Specialization in Cyber Physical System (CPS)** must demonstrate the ability to

PSO – 1	Analyze and verify the correctness of CPS implementations against system requirements and timing constraints.
PSO – 2	Design CPS requirements based on operating system and hardware architecture constraints.
PSO – 3	Implement specific software CPS using existing synthesis tools.
PSO -4	Analyze the functional behavior of CPS based on standard modeling formalisms.

6. (e) Program Structure for B. Tech in Electronics and Communication Engineering (with specialization in Cyber Physical System)

1. 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				
18PDH101L	General Aptitude	0	0	2	1
18PDH102T	Management Principles for Engineers	2	0	0	2
18PDH103J	Social Engineering	1	0	2	2
18PDH201L	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
18MAB203T	Probability and Stochastic Process	3	1	0	4
18MAB302T	Discrete Mathematics for Engineers	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
18ECS201T	Control Systems	3	0	0	3
	Total Learning Credits				**19**

Professional Core Courses (C)

Course Code	Course Title	Hours/ Week L	T	P	C
18ECC102J	Electronic Devices	3	0	2	4
18ECC103J	Digital Electronic Principles	3	0	2	4
18ECC104T	Signals and Systems	3	1	0	4
18ECC105T	Electromagnetics and Transmission Lines	3	0	0	3
18ECC201J	Analog Electronic Circuits	3	0	2	4
18ECC202J	Linear Integrated Circuits	3	0	2	4
18ECC203J	Microprocessor, Microcontroller and Interfacing Techniques	3	0	2	4
18ECC204J	Digital Signal Processing	3	0	2	4
18ECC205J	Analog and Digital Communication	3	0	2	4
18ECC206J	VLSI Design	3	0	2	4
18ECC301T	Wireless Communications	3	1	0	4
18ECC302J	Microwave & Optical Communications	3	0	2	4
18ECC303J	Computer Communication Networks	3	0	2	4
18ECC350T	Comprehension	0	1	0	1
	Total Learning Credits				**52**

Open Elective Courses (O)
(Any 4 Courses)

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
	Open Elective – 4	3	0	0	3
	Total Learning Credits				**12**

Professional Elective Courses (E)
(Any 6 Elective Courses)

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**

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

Course Code	Course Title	Hours/ Week L	T	P	C
18ECP101L	Massive Open Online Course – I	0	0	2	1
18ECP102L	Industrial Training – I				
18ECP103L	Seminar – I				
18ECP104L	Massive Open Online Course – II	0	0	2	1
18ECP105L	Industrial Training – II				
18ECP106L	Seminar – II				
18ECP107L	Minor Project	0	0	6	3
18ECP108L	Internship				
18ECP109L	Project	3	3	20	10
18ECP110L	Semester Internship				
	Total Learning Credits				**15**

List of Professional Elective Courses (E)

Course Code	Course Title	Hours/ Week L	T	P	C
18ECE250T	Principles of Cyber Physical System	3	0	0	3
18ECE251T	Embedded and Implanted Devices for Cyber Physical System	3	0	0	3
18ECE252T	Sensors and Actuators for Cyber Physical System	3	0	0	3
18ECE253T	Unsupervised Intelligence in Cyber Physical System	3	0	0	3
18ECE254T	Real Time Cyber Physical System	3	0	0	3
18ECE350T	Cyber Physical Interface and Automation	3	0	3	3
18ECE351T	High Performance Computing for Cyber Physical System	3	0	0	3
18ECE352T	Cyber Physical Control System	3	0	0	3
18ECE353T	Cyber Security	3	0	3	3
18ECE354T	Cloud and Distributed Systems for Cyber Physical System	3	0	0	3
18ECE355T	Design of Cyber Physical System	3	0	0	3
18ECE356T	Mobile Cyber Physical System	3	0	0	3
	Total Learning Credits				

Mandatory Courses (M)

Code	Course Title	L	T	P	C
18PDM101L	Professional Skills & Practices	0	0	2	0
18PDM201L	Competencies in Social Skills	0	0	2	0
18PDM202L	Critical & Creative Thinking Skills	0	0	2	0
18PDM301L	Analytical & Logical Thinking Skills	0	0	2	0
18LEM101T	Constitution of India	1	0	0	0
18LEM104J	Value Educationd	1	0	1	0
18GNM101L	Physical & Mental Health using Yoga	0	0	2	0
18GNM102L	NCC / NSS / NSO	0	0	2	0
18LEM109T	Indian Traditional Knowledge	1	0	0	0
18LEM110L	Indian Art Form	0	0	2	0
18CYM101T	Environmental Science	1	0	0	0
	Total Learning Credits				0

List of Open Elective Courses (O)
Any 4 Courses

Course Code	Course Title	Hours/ Week L	T	P	C
18ECO101T	Short-Range Wireless Communication	3	0	0	3
18ECO102J	Electronic Circuits & Systems	2	0	2	3
18ECO103T	Modern Wireless Communication Systems	3	0	0	3

18ECO104J	Audio and Speech Processing	2	0	2	3
18ECO105T	Underwater Acoustics	3	0	0	3
18ECO106J	PCB Design and Manufacturing	2	0	2	3
18ECO107T	Fiber Optics and Optoelectronics	3	0	0	3
18ECO108J	Embedded System Design using Arduino	2	0	2	3
18ECO109J	Embedded System Design Raspberry Pi	2	0	2	3
18ECO110J	3D Printing Hardware and Software	2	0	2	3
18ECO131J	Virtual Instrumentation	2	0	2	3
18ECO132T	Analytical Instrumentation	3	0	0	3
18ECO133T	Sensors and Transducers	3	0	0	3
18ECO134T	Industrial Automation	3	0	0	3
18ECO135T	Fundamentals of MEMS	3	0	0	3
18ECO121T	Basics of Biomedical Engineering	3	0	0	3
18ECO122T	Hospital Information Systems	3	0	0	3
18ECO123T	Biomedical Imaging	3	0	0	3
18ECO124T	Human Assist Devices	3	0	0	3
18ECO125T	Quality Control for Biomedical Devices	3	0	0	3
18ECO126T	Sports Biomechanics	3	0	0	3

6. (f) Program Articulation for B Tech in Electronics and Communication Engineering (with specialization in Cyber Physical System)

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	Automatic Control	Control of manufacturing and processing systems.	Effective Management Skills
18EES101J	Basic Electrical and Electronics Engineering	H	M	H	M	L										H
18MES103L	Civil and Mechanical Engineering Workshop	M			H	H					H		L	M	L	
18ECS201T	Control Systems	L		H	M									H		M
18ECC102J	Electronic Devices	L	M	H					M	H				L	L	M
18ECC103J	Digital Electronic Principles	L	M	H					M	H				H	L	
18ECC104T	Signals and Systems	L	H	M												H
18ECC105T	Electromagnetics and Transmission Lines	L		M	H									M		M
18ECC201J	Analog Electronic Circuits	M	L	H	H									H	L	
18ECC202J	Linear Integrated Circuits	M	L	H	H									H	L	
18ECC203J	Microprocessor, Microcontroller and Interfacing Techniques		M	H		H							L	H	L	
18ECC204J	Digital Signal Processing	M	L	H	H	H	M	L							L	H
18ECC205J	Analog and Digital Communication	L	L	H	H	H			H	M			M	H	L	
18ECC206J	VLSI Design															
18ECC301T	Wireless Communication	M					L	H	M					L		M
18ECC302J	Microwave & Optical Communications	L	L	H		M			L	L				L	L	
18ECC303J	Computer Communication Networks			M			H	H	L	L			M	L	L	
18ECC350T	Comprehension															
18ECP101L	MOOC / Industrial Training / Seminar – 1						M	L			H		H		M	
18ECP102L	MOOC / Industrial Training / Seminar – 2						M	L			H		H		M	
18ECP103L	Project (Phase-I) / Internship	M	M	H	H	M	H	H	L	H	H	H	H	H	H	M
18ECP103L	Project (Phase-II) / Semester Internship	M	M	H	H	M	H	H	L	H	H	H	H	H	H	M

H – High Correlation, M – Medium Correlation, L – Low Correlation, PSO – Program Specific Outcomes (PSO)

6. (g) Professional Electives for B Tech with Specialization in Cyber Physical System (CPS)

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	Automatic Control	Control of manufacturing and processing systems.	Effective Management Skills
18ECE250T	Principles of Cyber Physical System	H	M	H	M	L	L	M								H
18ECE251T	Embedded and Implanted Devices for Cyber Physical System	H			H	H			M		H		L	M	L	
18ECE252T	Sensors and Actuators for Cyber Physical System	H		H	M			L						H		M
18ECE253T	Unsupervised Intelligence in Cyber Physical System	H	M	H				L	M	H				L	L	M
18ECE254T	Real Time Cyber Physical System	H	M	H					M	H				H	L	

18ECE350T	Cyber Physical Interface and Automation	*H*	*M*	*M*												*H*
18ECE351T	High Performance Computing for Cyber Physical System	*H*		*M*	*H*									*M*		*M*
18ECE352T	Cyber Physical Control System	*H*	*M*	*H*	*H*									*H*	*L*	
18ECE353T	Cyber Security	*H*	*M*	*H*	*H*			*M*			*M*			*H*	*L*	
18ECE354T	Cloud and Distributed Systems for Cyber Physical System	*H*	*M*	*H*		*H*							*L*	*H*	*L*	
18ECE355T	Design of Cyber Physical System	*H*		*M*			*H*	*H*	*L*	*L*			*M*	*L*	*L*	
18ECE356T	Mobile Cyber Physical System	*H*		*H*		*M*					*M*			*M*		*L*

H – High Correlation, M – Medium Correlation, L – Low Correlation, PSO – Program Specific Outcomes (PSO)