

# **ACADEMIC CURRICULA**

## **UNDERGRADUATE DEGREE PROGRAMMES**

### **Bachelor of Technology**

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

**(New Programmes)**

**Regulations 2018**

**Volume – 4(10)**

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**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**

## 7. B. Tech in Electronics and Communication Engineering with specialization in Data Science

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

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

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

The Program Educational Objectives for the Electronics and Communication Engineering with specialization in Data Science program describe accomplishments that graduates are expected to attain within five years after graduation. Graduates within 5 years of graduation will / should demonstrate:

<b>PEO – 1</b>	<b>Expertise</b> using their mathematical and scientific knowledge to solve emerging real-world problems design and <b>create</b> novel products and solutions related to predictive data analysis and modeling that are technically sound, economically feasible and socially acceptable.
<b>PEO – 2</b>	Broad knowledge to <b>establish</b> themselves as <b>creative</b> practicing professionals, locally and globally, in fields such as design, research, testing and data analytics in the area of Electronics and Communication Engineering.
<b>PEO – 3</b>	Communication skills (in both written and oral forms) and critical reasoning skills in <b>bridging</b> the divide between advanced technology and end users in the practice of analyzing , modeling and visualizing data from Electronics and Communication applications.
<b>PEO – 4</b>	Sustained <b>learning</b> and adapting to a constantly changing field through graduate work, professional development, self-study and collaborative activities.
<b>PEO – 5</b>	<b>Leadership</b> and initiative to ethically advance professional and organizational goals, facilitate the achievements of others, and obtain substantive results.
<b>PEO – 6</b>	Ability to work productively as individuals and in groups ( <b>teamwork</b> ) of diverse cultural and multidisciplinary backgrounds.

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

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

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

### 7. (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	H	L	L	L	L	L	M	H	H	M	L		
PEO - 2	H	H	M	H	M	L	L	L	L	L	L	L	L	H	M		

PEO - 3	L	M	L	M	L	M	L	L	M	H	L	M	L	M	M
PEO - 4	M	L	M	L	M	L	L	M	M	M	L	H	M	L	M
PEO - 5	L	L	L	L	L	L	L	L	M	H	M	H	L	L	M
PEO - 6	L	L	L	L	L	M	L	L	H	H	M	L	L	L	M

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

### Program Specific Outcomes (PSO)

Graduates of baccalaureate degree program in ECE with Specialization in Data Science must demonstrate the ability to

<b>PSO – 1</b>	Collect and manage data from Electronics and Communication systems while also applying and evaluating models to devise solutions to data science tasks.
<b>PSO – 2</b>	Interpret data analysis outcomes and effectively communicate in various data formats
<b>PSO – 3</b>	Apply data analytics to monitor and optimize wired and wireless communication networks.

## 7. (e) Program Structure for B.Tech in Electronics and Communication Engineering with specialization in Data Science

1. Humanities & Social Sciences including Management Courses (H)						
Course Code	Course Title	Hours/ Week			C	
		L	T	P		
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	
18PDH103TJ	Social Engineering	2	0	0	2	
18PDH201L	Employability Skills & Practices	0	0	2	1	
Total Learning Credits					12	

2. Basic Science Courses (B)						
Course Code	Course Title	Hours/ Week			C	
		L	T	P		
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	

3. Engineering Science Courses (S)						
Course Code	Course Title	Hours/ Week			C	
		L	T	P		
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	

4. Professional Core Courses (C)						
Course Code	Course Title	Hours/ Week			C	
		L	T	P		
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	

5. Professional Elective Courses (E)						
Course Code	Course Title	Hours/ Week			C	
		L	T	P		
	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			C	
		L	T	P		
	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	

7. Project Work, Seminar, Internship In Industry / Higher Technical Institutions (P)						8. Mandatory Courses (M)					
Course Code	Course Title	Hours/ Week				Course Code	Course Title	Hours/ Week			
		L	T	P	C			L	T	P	C
18ECP101L	MOOC / Industrial Training / Seminar – 1	0	0	2	1	18PDM101L	Professional Skills & Practices	0	0	2	0
18ECP102L	MOOC / Industrial Training / Seminar – 2	0	0	2	1	18PDM201L	Competencies in Social Skills	0	0	2	0
18ECP103L	Project (Phase-I) / Internship	0	0	6	3	18PDM202L	Critical & Creative Thinking Skills	0	0	2	0
18ECP104L	Project (Phase-II) / Semester Internship	0	0	20	10	18PDM301L	Analytical & Logical Thinking Skills	0	0	2	0
Total Learning Credits					15	18LEM101T	Constitution of India	1	0	0	0
						18LEM104J	Value Education	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 Professional Elective Courses (E)						List of Open Elective Courses (O)					
Course Code	Course Title	Hours/ Week				Course Code	Course Title	Hours/ Week			
		L	T	P	C			L	T	P	C
18ECE271T	Introduction to Data Science	3	0	0	3	18ECO101T	Short-Range Wireless Communication	3	0	0	3
18ECE272T	Statistical Inference Techniques	3	0	0	3	18ECO102J	Electronic Circuits & Systems	2	0	2	3
18ECE371T	Regression and Multivariate Data Analysis	3	0	0	3	18ECO103T	Modern Wireless Communication Systems	3	0	0	3
18ECE372J	Python for Data Sciences	2	0	2	3	18ECO104J	Audio and Speech Processing	2	0	2	3
18ECE373T	Cloud and Distributed Computing	3	0	0	3	18ECO105T	Underwater Acoustics	3	0	0	3
18ECE374J	Data Simulation through R	2	0	2	3	18ECO106J	PCB Design and Manufacturing	2	0	2	3
18ECE471T	Data Science for Communication Networks	3	0	0	3	18ECO107T	Fiber Optics and Optoelectronics	3	0	0	3
18ECE472T	Data Base Management Systems	3	0	0	3	18ECO108J	Embedded System Design using Arduino	2	0	2	3
18ECE473T	Data Security	3	0	0	3	18ECO109J	Embedded System Design Raspberry Pi	2	0	2	3
18ECE332T	Principles of Artificial Intelligence	3	0	0	3	18ECO110J	3D Printing Hardware and Software	2	0	2	3
18ECE339T	Data Analysis and Visualization	3	0	0	3	18ECO131J	Virtual Instrumentation	2	0	2	3
18CSE392T	Machine Learning - 1	3	0	0	3	18ECO132T	Analytical Instrumentation	3	0	0	3
18CSE391T	Big Data tools and Techniques	3	0	0	3	18ECO133T	Sensors and Transducers	3	0	0	3
18CSE484T	Deep Learning	3	0	0	3	18ECO134T	Industrial Automation	3	0	0	3
18CSE355T	Data Mining and Analytics	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

**7. (f) Program Articulation for B.Tech in Electronics and Communication Engineering with specialization in Data Science**

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: Professional Achievement
														PSO-2: Project Management Techniques
														PSO-3: Analyze & Research
18EES101J	Basic Electrical and Electronics Engineering	H	M	H	M	L								
18MES103L	Civil and Mechanical Engineering Workshop	M			H	H						L		
18ECS201T	Control Systems	L		H	M									
18ECC102J	Electronic Devices	L	M	H										
18ECC103J	Digital Electronic Principles	L	M	H										
18ECC104T	Signals and Systems	L	H	M										
18ECC105T	Electromagnetics and Transmission Lines	L		M	H									M
18ECC201J	Analog Electronic Circuits	M	L	H	H									H
18ECC202J	Linear Integrated Circuits	M	L	H	H									L
18ECC203J	Microprocessor, Microcontroller and Interfacing Techniques		M	H		H						L	H	L
18ECC204J	Digital Signal Processing	M	L	H	H	H								L
18ECC205J	Analog and Digital Communication	L	L	H	H	H				M		M	H	L
18ECC206J	VLSI Design													
18ECC301T	Wireless Communication	M					L						L	M
18ECC302J	Microwave & Optical Communications	L	L	H		M			L				L	L
18ECC303J	Computer Communication Networks			M		H			L			M	L	L
18ECC350T	Comprehension													
18ECP101L	MOOC / Industrial Training / Seminar – 1						M	L		H	H		H	M
18ECP102L	MOOC / Industrial Training / Seminar – 2						M	L		H	H		H	M
18ECP103L	Project (Phase-I) / Internship	M	M	H	H	M	H	H	L	H	H	H	H	H
18ECP103L	Project (Phase-II) / Semester Internship	M	M	H	H	M	H	H	L	H	H	H	H	H
18ECE271T	Introduction to Data Science	M			H	H	-	-	-	-	-	-	L	H
18ECE272T	Statistical Inference Techniques	M	H		H	H		L						L
18ECE371T	Regression and Multivariate Data Analysis	L	H		H	H			H	M			M	H
18ECE372J	Python for Data Science	M	H		H				M				L	M
18ECE373T	Cloud and Distributed Computing	M			H				M				L	M
18ECE374J	Data Simulation through R	L	L	H		M							L	L
18ECE471T	Data Science for Communication Networks	H		M	M	L						M	L	L
18ECE472T	Data Base Management Systems	H		M	M	L						M	L	L
18ECE473T	Data Security	M		M	M							H		M
18CSE392T	Machine Learning - 1	M	H	M	M							H		M
18CSE391T	Big Data tools and Techniques	H		H	H	H	-	-	-	-	-	-	L	H
18ECE339T	Data Analysis and Visualization	M					M	L				H		M
18CSE484T	Deep Learning	H	H	-		H						H	H	H
18CSE355T	Data Mining and Analytics	M				H	L	H	M				L	M
18ECE332T	Principles of Artificial Intelligence	H	H	H									H	H

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