ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

Bachelor of Technology
In
Electronics Engineering
(VLSI Design and Technology)

(B.Tech. - Four Years)

(Choice Based Flexible Credit System)

Regulations 2021

CURRICULUM

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

B.Tech. in Electronics Engineering (VLSI Design and Technology)

(a) Mission of the Department

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

(b) Program Educational Objectives (PEO)

Graduates within 4 years of graduation will / should demonstrate:

PEO - 1	*Apply the acquired knowledge and skills in solving real-world engineering problems, considering national/global and societal issues such as health, environment, and safety.*
PEO - 2	*Design VLSI systems, which are economically feasible and socially relevant for promoting sustainable semiconductor and electronics eco-system.*
PEO - 3	*Develop an attitude toward pursuing knowledge and advanced education for sustained career advancement to adapt to emerging fields.*
PEO - 4	*Demonstrate leadership qualities and effective communication skills to work in a team of enterprising people in a multidisciplinary and multicultural environment with strong adherence to professional ethics.*

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

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

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

(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*	PSO 1: Problem-Solving Skills	PSO 2: Professional Skills	PSO 3: Successful Career and Entrepreneurship
PEO - 1	*3*	*3*				*3*	*3*	*2*					*3*	*3*	
PEO - 2			*3*	*3*	*3*	*3*			*2*		*3*		*3*		
PEO - 3				*3*	*3*		*2*	*2*		*2*		*3*			*3*
PEO - 4								*3*	*3*	*3*	*3*				*3*

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

PSO – Program Specific Outcomes (PSO)

PSO - 1	***Problem Solving Skills**: Contribute to the Indian/global semiconductor and electronics ecosystem with innovative approaches to design, manufacture, and test integrated systems.*
PSO - 2	***Professional Skills**: Apply knowledge of complete design flow from specification to silicon in areas of both digital and analog VLSI Design*
PSO - 3	***Successful Career and Entrepreneurship**: Promote inter-disciplinary work in semiconductor physics, computer science, and electrical engineering to create exciting new systems with greatly increased functionalities.*

(e) Program Structure: B.Tech. in Electronics Engineering (VLSI Design and Technology)

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				
21LEH106	Korean Language				
21LEH107T	Spanish Language				
21GNH101J	Philosophy of Engineering	1	0	2	2
21PDH201T	Social Engineering	2	0	0	2
21GNH401T	Behavioral Psychology	2	1	0	3
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 Process	3	1	0	4
21MAB302T	Discrete Mathematics	3	1	0	4
21BTB103T	Biology	2	0	0	2
Total Learning Credits					32

3. Engineering Science Courses (S)					
Course Code	Course Title	Hours/ Week L	T	P	C
21MES101L	Basic Civil and Mechanical Workshop	1	0	4	3
21MES102L	Engineering Graphics and Design	1	0	4	3
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21CSS101J	Programming for Problem Solving	3	0	4	5
21CSS201T	Computer Organization and Architecture	3	0	0	3
21DCS201P	Design Thinking and Methodology	1	2	0	3
21CSS303T	Data Science	2	0	0	2
Total Learning Credits					23

4. Professional Core Courses (C)					
Course Code	Course Title	Hours/ Week L	T	P	C
21ECC101J	Electronic System and PCB Design	2	0	2	3
21ECC201J	Solid State Devices	2	0	2	3
21ECC202T	Analog and Linear Electronic Circuits	3	0	0	3
21ECC203J	Digital logic Design	2	0	2	3
21ECC204T	Signal Processing	3	0	0	3
21ECC205T	Electromagnetic Theory and Interference	3	0	0	3
21ECC211L	Devices and Digital IC Lab	0	0	4	2
21ECC222L	Analog and Linear Electronic Circuits Lab	0	0	4	2
21ECC301P	Microprocessor, Microcontroller and Interfacing Techniques	3	2	0	4
21ECC305T	Digital Logic Synthesis using HDL	2	0	0	2
21ECC303T	VLSI Design and Technology	3	0	0	3
21ECC306T	CMOS Analog and Mixed Signal IC Design	2	0	0	2
21ECC311L	VLSI Design Lab	0	0	4	2
21ECC333L	CMOS Analog and Digital VLSI Lab	0	0	4	2
21ECC403T	RF Integrated Circuits and systems	3	0	0	3
21ECC404T	Physical Design and Automation	2	1	0	3
21CSC206T	Artificial Intelligence	2	1	0	3
Total Learning Credits					46

5. Professional Elective Courses (E) (Any 6 Elective Courses)					
Course Code	Course Title	Hours/ Week L	T	P	C
21ECE260T	Industrial Electronics	3	0	0	3
21ECE261T	Measurements and Instrumentation	3	0	0	3
21ECE262T	Low Power Sensors Technology	3	0	0	3
21ECE263T	Micro, Nano Electro Mechanical devices	3	0	0	3
21ECE204T	Optoelectronics	3	0	0	3
21ECE205T	Flexible Electronics	3	0	0	3
21ECE301T	Nanoscale Electronic Devices	3	0	0	3
21ECE361T	Consumer Electronics & Trouble shooting	3	0	0	3
21ECE362T	Quality and Reliability Engineering	3	0	0	3
21ECE363T	Electronic Packaging	3	0	0	3
21ECE364T	Digital Signal Processors Architectures and Applications	3	0	0	3
21ECE365T	Design Verification of VLSI circuits	3	0	0	3
21ECE460T	Emerging Processor based System Design	3	0	0	3
21ECE461T	Semiconductor Memory Design	3	0	0	3
21ECE462T	Machine Learning and Artificial Intelligence for Electronics Design	3	0	0	3
21ECE463T	Scripting Language for Electronic Design Automation	3	0	0	3
21ECE464T	Statistical Analysis and Optimization for VLSI	3	0	0	3
21ECE465T	Device and Process Modelling	3	0	0	3
21ECE466T	Low Power Circuit Design	3	0	0	3
21ECE467T	High speed IC Design	3	0	0	3
21ECE468T	System and Network On Chip	3	0	0	3
21ECE404T	Terahertz Devices and Applications	3	0	0	3
Total Learning Credits					18

6. Open Elective Courses (O) (Any 3 courses) offered by School of Electrical and Electronics Engineering					
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	PCB Design and Manufacturing	2	0	2	3
18ECO105T	Fiber Optics and Optoelectronics	3	0	0	3
18ECO106J	Embedded System Design using Arduino	2	0	2	3
18ECO107J	Embedded System Design using Raspberry Pi	2	0	2	3
18ECO108J	3D Printing Hardware and Software	2	0	2	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
21ECP350L	Community Connect (To be completed in 4th sem vacation)	0	0	2	1
21ECP351L	Project (Compulsory for exit option at 6th sem)	0	0	6	3
21ECP352L	MOOC	3	0	0	
21ECP451L	Major Project	0	0	30	15
21ECP452L	Semester Internship				
Total Learning Credits					19

8. Mandatory Courses (M)					
Code	Course Title	L	T	P	C
21PDM101L	Professional Skills and Practices	0	0	2	0
21CYM101T	Environmental Science	1	0	0	0
21PDM102L	General Aptitude	0	0	2	0
21LEM201T	Professional Ethics*	1	0	0	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

(f) Implementation Plan: B.Tech. in Electronics Engineering (VLSI Design and Technology)

Implementation Plan

Semester – I

Code	Course Title	Hours/ Week L	T	P	C
21LEH102T/ 21LEH103T/ 21LEH104T/ 21LEH105T/ 21LEH106T/ 21LEH107T/ 21LEH101T	Chinese Language/ French Language / German Language / Japanese Language / Korean Language / Spanish Language / Communicative English	2	1	0	3
21GNH101J	Philosophy of Engineering	1	0	2	2
21MAB101T	Calculus and Linear Algebra	3	1	0	4
21CYB101J/ 21PYB101J	Chemistry / Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21BTB103T	Biology	2	0	0	2
21MES101L/ 21MES102L	Basic Civil and Mechanical Workshop / Engineering Graphics and Design	1	0	4	3
21CSS101J/ 21EES101T	Programming for Problem Solving / Electrical and Electronics Engineering	3	0	4	5
21PDM101L	Professional Skills and Practices	0	0	2	0
Total Learning Credits					24

Semester – II

Code	Course Title	Hours/ Week L	T	P	C
21LEH101T/ 21LEH102T/ 21LEH103T/ 21LEH104T/ 21LEH105T/ 21LEH106T/ 21LEH107T	Communicative English/ Chinese Language/ French Language / German Language / Japanese Language / Korean Language / Spanish Language	2	1	0	3
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21PYB101J/ 21CYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics/ Chemistry	3	1	2	5
21MES102L/ 21MES101L	Engineering Graphics and Design / Basic Civil and Mechanical Workshop	1	0	4	3
21EES101T/ 21CSS101J	Electrical and Electronics Engineering/ Programming for Problem Solving	3	1	0	4
21ECC101J	Electronic System and PCB Design	2	0	2	3
21CYM101T	Environmental Science*	1	0	0	0
21PDM102L	General Aptitude*	0	0	2	0
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
21DCS201P	Design Thinking and Methodology	1	2	0	3
21CSS201T	Computer Organization and Architecture	3	0	0	3
21ECC201J	Solid State Devices	2	0	2	3
21ECC203J	Digital logic Design	2	0	2	3
21ECC205T	Electromagnetic Theory and Interference	3	0	0	3
21ECC211L	Devices and Digital IC Lab	0	0	4	2
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 Process	3	1	0	4
21ECC202T	Analog and Linear Electronic Circuits	3	0	0	3
21ECC204T	Signal Processing	3	0	0	3
21ECC222L	Analog and Linear Electronic Circuits Lab	0	0	4	2
21CSC206T	Artificial Intelligence	2	1	0	3
E	Professional Elective-I				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
21MAB302T	Discrete Mathematics	3	1	0	4
21ECC301P	Microprocessor, Microcontroller and Interfacing Techniques	3	2	0	4
21ECC303T	VLSI Design and Technology	3	0	0	3
21ECC311L	VLSI Design Lab	0	0	4	2
E	Professional Elective – II				3
O	Open Elective – I	3	0	0	3
21ECP350L	Community Connect (To be completed in 4th sem vacation)	0	0	2	1
21PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
Total Learning Credits					20

Semester – VI

Code	Course Title	Hours/ Week L	T	P	C
21CSS303T	Data Science	2	0	0	2
21ECC305T	Digital Logic Synthesis using HDL	2	0	0	2
21ECC306T	CMOS Analog and Mixed Signal IC Design	2	0	0	2
21ECC333L	CMOS Analog and Digital VLSI Lab	0	0	4	2
E	Professional Elective – III	3	0	0	3
E	Professional Elective – IV	3	0	0	3
O	Open Elective – II	3	0	0	3
21ECP351L/ 21ECP352L	Project (compulsory for exit option at 6th semester) / MOOC	0 / 3	0 / 0	6 / 0	3
21PDM302L	Employability Skills and Practices	0	0	2	0
Total Learning Credits					20

Semester – VII

Code	Course Title	Hours/ Week L	T	P	C
21GNH401T	Behavioral Psychology	2	1	0	3
21ECC403T	RF Integrated Circuits and systems	3	0	0	3
21ECC404T	Physical Design and Automation	3	0	0	3
E	Professional Elective - V	2	0	2	3
E	Professional Elective - VI	2	0	2	3
O	Open Elective – 3	3	0	0	3
Total Learning Credits					18

Semester – VIII

Code	Course Title	Hours/ Week L	T	P	C
21ECP451L/ 21ECP452L	Major Project / Semester Internship	0	0	30	15
Total Learning Credits					15