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 2024)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

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

35. (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.*

35. (b) Program Educational Objectives (PEO)

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.*

35. (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*

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

35. (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*	*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*

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

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

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				
21LEH108T	Russian				
21GNH101J	Philosophy of Engineering	1	0	2	2
21PDH209T [1]	Social Engineering	2	0	0	2
21GNH401T	Behavioral Psychology	2	1	0	3
				Total Credits	13

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
21MAB302T	Discrete Mathematics	3	1	0	4
21BTB103T	Biology	2	0	0	2
				Total Credits	32

Engineering Science Courses (S)

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

Open Elective Courses (O)

(Any 3 courses)

Course Code	Course Title	Hours / Week L	T	P	C
21ECO101T	Short Range Wireless Communication	3	0	0	3
21ECO102J	Electronic Circuits and Systems	2	0	2	3
21ECO103T	Modern Wireless Communication Systems	3	0	0	3
21ECO104J	PCB Design and Manufacturing	2	0	2	3
21ECO105T	Fiber Optics and Optoelectronics	3	0	0	3
21ECO106J	Embedded System Design using Arduino	2	0	2	3
21ECO107J	Embedded System Design using Raspberry Pi	2	0	2	3
21ECO108J	3D Printing Hardware and Software	2	0	2	3
21ECO109T	5G Technology – An Overview	3	0	0	3
				Total Credits	09

Professional Core Courses (C)

Course Code	Course Title	Hours / Week L	T	P	C
21ECC101J	Electronic System and PCB Design	2	0	2	3
21ECC201T [2]	Solid State Devices	3	0	0	3
21ECC202T	Analog and Linear Electronic Circuits	3	0	0	3
21ECC203T	Digital Logic Design	3	0	0	3
21ECC204T [2]	Signal Processing	3	0	0	3
21ECC205T	Electromagnetic Theory and Interference	3	0	0	3
21ECC211L [1]	Devices and Digital IC Laboratory	0	0	4	2
21ECC222L [1]	Analog and Linear Electronic Circuits Laboratory	0	0	4	2
21ECC301P [1]	Microprocessor, Microcontroller, and Interfacing Techniques	3	1	0	4
21ECC305T [2]	Digital Logic Synthesis using HDL	3	0	0	3
21ECC303T [2]	VLSI Design and Technology	3	0	0	3
21ECC306T	CMOS Analog and Mixed Signal IC Design	3	0	0	3
21ECC311L [1]	VLSI Design Laboratory	0	0	4	2
21ECC333L [1]	CMOS Analog and Digital VLSI Laboratory	0	0	4	2
21ECC403T [2]	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 Credits	48

Non Credit Courses (M)

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

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

Course Code	Course Title	Hours / Week			C
		L	T	P	
21GNP301L [1]	Community Connect	0	0	2	1
21ECP302L [1]	Project	0	0	6	3
21ECP303T [1]	MOOC	3	0	0	
21ECP401L	Major Project	0	0	30	15
21ECP402L	Major Project	0	0	20	10
21ECP403L	Internship#	0	0	10	5
				Total Credits	**19**

Professional Elective Courses (E)
(Any 6 Courses)

Course Code	Course Title	Hours / Week			C
		L	T	P	
21ECE201J	Python and Scientific Python	2	0	2	3
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 Electromechanical 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 and 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

Professional Elective Courses (E)

Course Code	Course Title	Hours / Week			C
		L	T	P	
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 Credits	**18**

35. (f) Programme Articulation: B.Tech. in Electronics Engineering (VLSI Design and Technology)

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
21ECC305T	Digital Logic Synthesis using HDL	2.66	2.4	2	3	-	-	-	-	-	-	-	-	2.8	-	-
21ECC306T	CMOS Analog and Mixed Signal IC Design	1	2	3	2.5	-	2	-	-	-	-	-	2	-	-	-
21ECC403T	RF Integrated Circuits and Systems	2	2	3	-	-	-	-	-	-	-	-	-	-	-	3
21ECC404T	Physical Design and Automation	2.5	2.5	-	2	-	-	-	-	-	-	-	-	2.75	2	-
21ECC333L	CMOS Analog and Digital VLSI Laboratory	-	2.25	3	-	3	-	-	-	-	-	-	2	-	-	2
21ECE260T	Industrial Electronics	2.75	2	2	3	-	-	-	-	-	-	-		1.66	2	-
21ECE261T	Measurements and Instrumentation	3	2	2	2	-	-	-	-	-	-	-	2	1	-	-
21ECE262T	Low Power Sensors Technology	2.2	-	3	-	-	-	-	-	-	-	-	-	2.66	-	-
21ECE361T	Consumer Electronics and Troubleshooting	2.75	2	2	3	-	-	-	-	-	-	-	-	1.66	2.5	-
21ECE364T	Digital Signal Processors, Architectures and Applications	2.2	-	3	-	-	-	-	-	-	-	-	-	2	2	-
21ECE363T	Electronic Packaging	3	2	-	-	-	-	-	-	-	-	-	2.33	2.25	-	-
21ECE367T	Design Verification of VLSI Circuits	2.75	2.25	1.5	-	2	-	-	-	-	-	-	-	3	-	-
21ECE460T	Emerging Processor based System Design	-	2	2.4	1.66	1.5	-	-	-	-	-	-	-	-	2	2
21ECE461T	Semiconductor Memory Design	2.8	2	-	-	-	-	-	-	-	-	-	-	1.8	-	-
21ECE462T	Machine Learning and Artificial Intelligence for Electronics Design	1.5	2	2	3	3	-	-	-	-	-	-	2.5	3	3	-
21ECE463T	Scripting Language for Electronic Design Automation	-	2	3	2.66	2	-	-	-	-	-	-	-	-	-	2
21ECE464T	Statistical Analysis and Optimization for VLSI	1	2	3	2.5	-	-	-	-	-	-	-	-	-	-	1.8
21ECE466T	Low Power Circuit Design	3	3	2.8	1.66	3	-	-	-	-	-	-	-	3	-	-
21ECE467T	High speed IC Design	2.2	2.8	-	-	-	-	-	-	-	-	-	-	2	2	-
21ECE468T	System and Network on Chip		2.5	3	2	2	-	-	-	-	-	-	-	3	-	2
21ECC101J	Electronic System and PCB Design	3	2.5	2.67	-	3	-	-	-	-	-	2	-	2.8	2.5	-
21ECC201T	Solid State Devices	3	2	-	-	-	-	-	-	-	-	-	1	1	-	-
21ECC203T	Digital logic Design	3	2	2	-	3	-	-	-	-	-	-	-	3	-	-
21ECC205T	Electromagnetic Theory and Interference	2.4	2.6	-	-		-	-	-	-	-	-	-	-	-	-
21ECC211L	Devices and Digital IC Laboratory	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
21ECC202T	Analog and Linear Electronic Circuits	2	2	3	-	-	-	-	-	-	-	-	-	-	-	3
21ECC204T	Signal Processing	2	2.2	3	3	-	-	-	-	-	-	-	-	-	-	2.2
21ECC222L	Analog and Linear Electronic Circuits Laboratory	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-
21ECC301P	Microprocessor, Microcontroller, and Interfacing Techniques	-	3	3	-	3	-	-	-	-	-	-	-	2.67	-	-
21ECC303T	VLSI Design and Technology	-	2.4	2.25	-		-	-	-	-	-	-	-	2	2	-
21ECC311L	VLSI Design Laboratory	3	3		-	1	-	-	-	-	-	-	-	1		-
21ECE263T	Micro, Nano Electromechanical devices	2.4	2	2.75	-	-	-	-	-	-	-	-	-	3	2.67	3
21ECE204T	Optoelectronics	2.8	2.67	2.67	2.67	-	-	-	-	-	-	-	-	-	-	2.4
21ECE205T	Flexible Electronics	3	3	-	-	-	-	-	-	-	-	-	3	-	-	
21ECE301T	Nanoscale Electronic Devices	3	2.5	-	-	2.5	-	-	-	-	-	-	-	2	-	2.5
21ECE362T	Quality and Reliability Engineering	3	1.5	2	-	-	-	-	-	-	-	-	-		-	2
21ECE365T	Design Verification of VLSI circuits	2.75	2.25	1.5	-	2	-	-	-	-	-	-	-	3	-	-
21ECE460T	Emerging Processor based System Design	-	2	2.4	1.66	1.5	-	-	-	-	-	-	-		2	2
21ECE461T	Semiconductor Memory Design	2.8	2	-	-	-	-	-	-	-	-	-	-	1.8	-	-
21ECE465T	Device and Process Modelling	3	3	-	-	-	-	-	-	-	-	-	3	3	-	-
21ECE404T	Terahertz Devices and Applications	3	2.75	2	2	-	-	2	-	-	-	-	-	2.3	2	3
21ECE201J	Python and Scientific Python	-	2.67	3	2	3	-	-	-	3	-	-	-	3	-	2.67
21GNP301L	Community Connect						3		3	3	2					
21ECP302L	Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21ECP303T	MOOC	3	2											3		
21ECP401L	Major Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21ECP402L	Major Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21ECP403L	Internship	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Program Average		2.53	2.30	2.51	2.37	2.32	2.00	2.00	-	3.00	-	2.00	2.23	2.28	2.21	2.37

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

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 [1]	Engineering Graphics and Design	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21CYM101T [1]	Environmental Science	1	0	0	0
21PDM101L [1]	Professional Skills and Practices	0	0	2	0
21LEM101T [1]	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				
21LEH108T	Russian				
21GNH101J	Philosophy of Engineering	1	0	2	2
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21CYB101J	Chemistry	3	1	2	5
21ECC101J	Electronic System and PCB Design	2	0	2	3
21CSS101J	Programming for Problem Solving	3	0	2	4
21BTB103T	Biology	2	0	0	2
21MES101L [1]	Basic Civil and Mechanical Workshop	0	0	4	2
21PDM102L [1]	General Aptitude	0	0	2	0
21GNM101L [1]	Physical and Mental Health using Yoga	0	0	2	0
21GNM102L [1]	National Service Scheme				
21GNM103L [1]	National Cadet Corps				
21GNM104L [1]	National Sports Organization				
				Total Credits	25

Semester – III

Course Code	Course Title	Hours / Week L	T	P	C
21MAB201T	Transforms and Boundary Value Problems	3	1	0	4
21PDH209T [1]	Social Engineering	2	0	0	2
21CSS201T	Computer Organization and Architecture	3	1	0	4
21ECC201T [2]	Solid State Devices	3	0	0	3
21ECC203T	Digital Logic Design	3	0	0	3
21ECC205T	Electromagnetic Theory and Interference	3	0	0	3
21ECC211L [1]	Devices and Digital IC Laboratory	0	0	4	2
21LEM201T [1]	Professional Ethics	1	0	0	0
21PDM201L [1]	Verbal Reasoning	0	0	2	0
21LEM202T [1]	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3
				Total Credits	24

Semester – IV

Course Code	Course Title	Hours / Week L	T	P	C
21MAB203T	Probability and Stochastic Processes	3	1	0	4
21ECC202T	Analog and Linear Electronic Circuits	3	0	0	3
21ECC204T [2]	Signal Processing	3	0	0	3
21ECC222L [1]	Analog and Linear Electronic Circuits Laboratory	0	0	4	2
21CSC206T	Artificial Intelligence	2	1	0	3
E	Professional Elective-I				3
21DCS201P [1]	Design Thinking and Methodology	1	0	4	3
21PDM202 [1]	Critical and Creative Thinking Skills	0	0	2	0
				Total Credits	21

Semester – V

Course Code	Course Title	Hours / Week L	T	P	C
21MAB302T	Discrete Mathematics	3	1	0	4
21ECC301P [1]	Microprocessor, Microcontroller, and Interfacing Techniques	3	1	0	4
21ECC303T [2]	VLSI Design and Technology	3	0	0	3
21ECC311L [1]	VLSI Design Laboratory	0	0	4	2
E	Professional Elective – II				3
O	Open Elective – I				3
21GNP301L [1]	Community Connect	0	0	2	1
21PDM301L [1]	Analytical and Logical Thinking Skills	0	0	2	0
21LEM301T [1]	Indian Art Form	1	0	0	0
				Total Credits	20

Semester – VI

Course Code	Course Title	Hours / Week L	T	P	C
21CSS303T	Data Science	2	0	0	2
21ECC305T [2]	Digital Logic Synthesis using HDL	3	0	0	3
21ECC306T	CMOS Analog and Mixed Signal IC Design	3	0	0	3
21ECC333L [1]	CMOS Analog and Digital VLSI Laboratory	0	0	4	2
E	Professional Elective – III				3
E	Professional Elective – IV				3
O	Open Elective – II				3
21ECP302L [1]	Project	0	0	6	3
21ECP303T [1]	MOOC	3	0	0	
21PDM302L [1]	Employability Skills and Practices	0	0	2	0
21LEM302T [1]	Indian Traditional Knowledge	1	0	0	0
				Total Credits	22

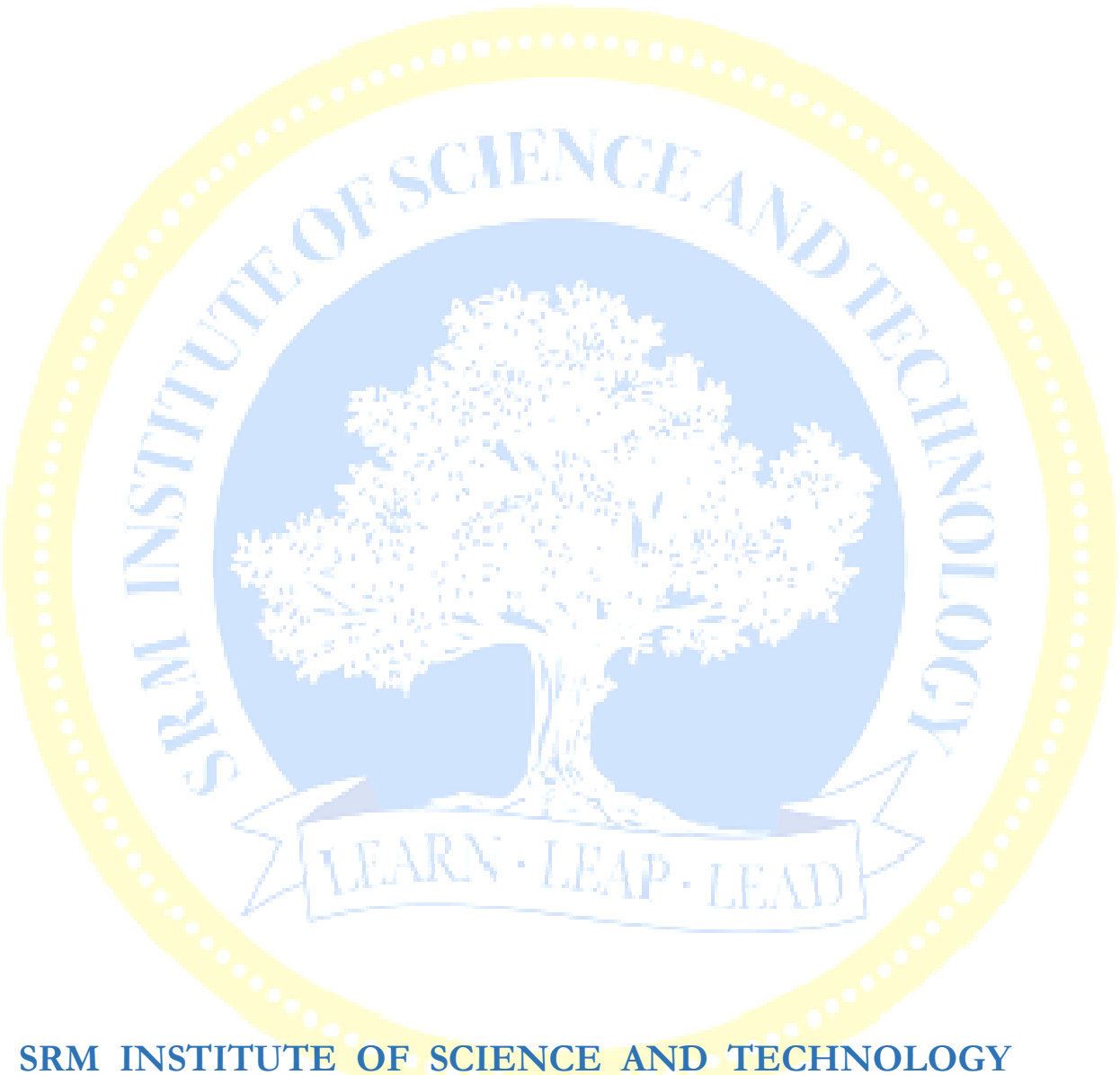
Semester – VII

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

Semester - VIII

Course Code	Course Title	Hours / Week L	T	P	C
21ECP401L	Major Project	0	0	30	15
21ECP402L	Major Project	0	0	20	10
21ECP403L	Internship#	0	0	10	5
				Total Credits	15

#Students have to register either 21ECP401L or 21ECP402L and 21ECP403L 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