DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : **XXX M.Tech. (Microelectronics and VLSI)**
Department : **Department of Electronics and Communication Engineering**
Year : **I**
Model : **2**

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-531	Digital VLSI Circuit Design	PCC	4	3	0	2	3	0
2.	ECC-533	VLSI Technology	PCC	4	3	0	2	3	0
3.	ECC-535	Foundations of Semiconductor Device Physics	PCC	4	3	0	2	3	0
4.	ECC-537	Analog VLSI Circuit Design	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.		Program Elective-II	PEC	4	-	-	-	-	-
3.		Program Elective-III	PEC	4	-	-	-	-	-
4.		Program Elective-IV	PEC	4	-	-	-	-	-
5.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
6.	ECC-700	Seminar	SEM	2	-	-	-	-	-
		Total		**21**					

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Program Code : **XXX M.Tech. (Microelectronics and VLSI)**
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Year : **II**
Model : **2**

Teaching Scheme					**Contact Hours/Week**			**Exam Duration**	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-691	Internship Social Activity	ISA	3-5	-	-	-	-	-
2.	ECC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		Total		**13-15**					
Semester-II (Spring)									
1.	ECC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		Total		**14**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	21	13-15	14
Total Credits	**66-68**			

M.Tech. (Microelectronics and VLSI)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ECL-532	Power Electronic Devices, Circuits and Systems	PEC	4	3	1	0	3	0
2.	ECL-525	Hardware Architecture for Deep-Learning	PEC	4	3	1	0	3	0
3.	ECL-526	Statistical Machine Learning for Variation-Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0
4.	ECL-561	Compact Modeling of Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-533	Semiconductor Device Modeling	PEC	4	3	1	0	3	0
6.	ECL-534	MOS Device Physics	PEC	4	3	1	0	3	0
7.	ECL-535	Digital System Design	PEC	4	3	1	0	3	0
8.	ECL-536	Semiconductor Microwave Devices & Applications	PEC	4	3	1	0	3	0
9.	ECL-537	Optoelectronic Materials & Devices	PEC	4	3	1	0	3	0
10.	ECL-538	Mixed Signal Circuit Design	PEC	4	3	1	0	3	0
11.	ECL-539	VLSI System Design	PEC	4	3	1	0	3	0
12.	ECL-540	Device & Circuit Interaction	PEC	4	3	1	0	3	0
13.	ECL-587	Nanoscale Devices	PEC	4	3	1	0	3	0
14.	ECL-541	Performance and Reliability of VLSI Circuits	PEC	4	3	1	0	3	0
15.	ECL-543	Advanced VLSI Interconnects	PEC	4	3	1	0	3	0
16.	ECL-545	Organic Electronics	PEC	4	3	1	0	3	0
17.	ECL-591	VLSI Physical Design	PEC	4	3	1	0	3	0
18.	ECL-546	Compound Semiconductors and RF Devices	PEC	4	3	1	0	3	0
19.	ECL-547	CAD for VLSI	PEC	4	3	1	0	3	0
20.	ECL-548	VLSI Digital Signal Processing	PEC	4	3	1	0	3	0

M.Tech. (Microelectronics and VLSI)

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
21.	ECL-549	VLSI Testing and Testability	PEC	4	3	1	0	3	0
22.	ECL-551	MEMS and NEMS	PEC	4	3	1	0	3	0
23.	ECL-552	Low Voltage CMOS Circuit Operation	PEC	4	3	1	0	3	0
24.	ECL-635	Magnetic Random Access Memory	PEC	4	3	1	0	3	0
25.	ECL-553	Advanced Analog IC Design	PEC	4	3	1	0	3	0

Science, Technology, and Advanced Research-tools Basket

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
1.	ECT-501	Inference and Learning Algorithms	STAR	3	3	0	0	3	0
2.	ECT-502	Semiconductor Technology and its Applications	STAR	3	3	0	0	3	0
3.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3	3	0	0	3	0
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3	3	0	0	3	0

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Department : **Department of Electronics and Communication Engineering**
Year : **I**
Model : **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-531	Digital VLSI Circuit Design	PCC	4	3	0	2	3	0
2.	ECC-533	VLSI Technology	PCC	4	3	0	2	3	0
3.	ECC-535	Foundations of Semiconductor Device Physics	PCC	4	3	0	2	3	0
4.	ECC-537	Analog VLSI Circuit Design	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		Total		**18**					
Semester-II (Spring)									
1.		Program Elective-I	PEC	4	-	-	-	-	-
2.	ECC-751A	Thesis Stage-I	THESIS	13	-	-	-	-	-
		Total		**17**					

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Program Code : **XXX Master of Science (by Research) in Microelectronics and VLSI**
Department : **Department of Electronics and Communication Engineering**
Year : **II**
Model : **3**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
Semester-I (Autumn)									
1.	ECC-751B	Thesis Stage-II	THESIS	15	-	-	-	-	-
		Total		**15**					
Semester-II (Spring)									
1.	ECC-751C	Thesis Stage-III	THESIS	16	-	-	-	-	-
		Total		**16**					

Summary				
Semester	**1**	**2**	**3**	**4**
Semester-wise Total Credits	18	17	15	16
Total Credits	**66**			

Master of Science (by Research) in Microelectronics and VLSI

Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
1.	ECL-532	Power Electronic Devices, Circuits and Systems	PEC	4	3	1	0	3	0
2.	ECL-525	Hardware Architecture for Deep-Learning	PEC	4	3	1	0	3	0
3.	ECL-526	Statistical Machine Learning for Variation-Aware Electronic Device and Circuit Simulation	PEC	4	3	1	0	3	0
4.	ECL-561	Compact Modeling of Semiconductor Devices	PEC	4	3	1	0	3	0
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15.	ECL-543	Advanced VLSI Interconnects	PEC	4	3	1	0	3	0
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20.	ECL-548	VLSI Digital Signal Processing	PEC	4	3	1	0	3	0

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Program Elective Courses

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	**Subject Code**	**Course Title**	**Subject Area**	**Credits**	**L**	**T**	**P**	**Theory**	**Practical**
21.	ECL-549	VLSI Testing and Testability	PEC	4	3	1	0	3	0
22.	ECL-551	MEMS and NEMS	PEC	4	3	1	0	3	0
23.	ECL-552	Low Voltage CMOS Circuit Operation	PEC	4	3	1	0	3	0
24.	ECL-635	Magnetic Random Access Memory	PEC	4	3	1	0	3	0
25.	ECL-553	Advanced Analog IC Design	PEC	4	3	1	0	3	0