

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

ProgramCode: **XXX M.Tech. (Terahertz Communication and Sensing)**
 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-501	Electromagnetic Field Theory and Scattering	PCC	3	3	0	0	3	0
2.	ECC-503	THz Electronics	PCC	3	3	0	0	3	0
3.	ECC-505	Linear Algebra and Random Processes	PCC	4	3	1	0	3	0
4.	ECC-507	Essential Concepts in THz Communication	PCC	4	3	1	0	3	0
5.	ECC-509	THz Design Lab	PCC	2	0	0	3	0	3
6.		Social Science Course	SSC	2	-	-	-	-	-
		Total		18					
Semester-II (Spring)									
1.		Program Elective-I	PEC	2	-	-	-	-	-
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		19					

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Program Code: **XXX M.Tech. (Terahertz Communication and Sensing)**
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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	19	13-15	14
Total Credits	64-66			

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M.Tech. (Terahertz Communication and Sensing)

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-503	Terahertz Communication Systems	PEC	4	3	1	0	3	0
2.	ECL-504	Millimeter Wave and Terahertz Antenna Design	PEC	4	3	1	0	3	0
3.	ECL-514	Detection and Estimation Theory	PEC	4	3	1	0	3	0
4.	ECL-505	High Speed Semiconductor Devices	PEC	4	3	1	0	3	0
5.	ECL-506	Surface Electromagnetics	PEC	4	3	1	0	3	0
6.	ECL-507	High-Frequency Dielectric Guides	PEC	4	3	1	0	3	0
7.	ECL-508	Terahertz Sensing and Imaging	PEC	4	3	1	0	3	0
8.	ECL-509	Microwave and Millimeter Wave Circuits	PEC	4	3	1	0	3	0
9.	ECL-510	Nonionizing Radiations and Health Risks	PEC	4	3	1	0	3	0
10.	ECL-511	Microwave Photonic ICs	PEC	4	3	1	0	3	0
11.	ECL-618	Wireless Technologies: 5G and Beyond	PEC	4	3	1	0	3	0
12.	ECL-620	Advanced Wireless Communication	PEC	4	3	1	0	3	0
13.	ECL-641	Advanced Machine Learning for THz Sensing	PEC	4	3	1	0	3	0
14.	ECL-642	Applied Optimization for THz Communication and Sensing	PEC	4	3	1	0	3	0
15.	ECL-643	Special Topics in THz Communication and Sensing	PEC	4	3	1	0	3	0
16.	ECL-644	Introduction to TinyML	PEC	4	3	1	0	3	0
17.	ECL-645	Introduction to Internet of Things (IoT)	PEC	4	3	1	0	3	0
18.	ECL-646	Introduction to Quantum Machine Learning	PEC	4	3	1	0	3	0
19.	ECL-647	Terahertz Optics and Metamaterials	PEC	4	3	1	0	3	0
20.	ECL-648	Advance Topics in THz Communication	PEC	4	3	1	0	3	0
21.	ECL-649	Optical Communication and Networks	PEC	4	3	1	0	3	0
22.	ECL-650	Advanced Data Networks	PEC	4	3	1	0	3	0
23.	ECL-564	Industry Oriented THz Lab.	PEC	2	0	0	3	0	3
24.	ECL-565	THz CAD Lab.	PEC	2	0	0	3	0	3
25.	ECL-566	6G Communication Lab.	PEC	2	0	0	3	0	3

M.Tech. (Terahertz Communication and Sensing)

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.	ECT-503	5G/6G Technology and its Societal Applications	STAR	3					
4.	ECT-504	Applications of RF Technology in Defence and Space Applications	STAR	3					