

**DEPARTMENT OF PHYSICS**  
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Tech. (Solid State Electronic Technology)**  
 Department: **Department of Physics**  
 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
<b>Semester-I (Autumn)</b>									
1.	PHC-501	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	0
2.	PHC-503	Fabrication and Characterization Techniques	PCC	3	3	0	0	3	0
3.	PHC-505	Laboratory Work in Solid-State Electronic Materials	PCC	3	0	0	6	0	6
4.	PHC-507	Semiconductor Device Physics	PCC	4	3	1	0	3	0
5.	PHC-509	Science and Technology of Thin Films	PCC	3	3	0	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		<b>Total</b>		<b>18</b>					
<b>Semester-II (Spring)</b>									
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.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		<b>Total</b>		<b>21</b>					

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Program Code: **XXX M.Tech. (Solid State Electronic Technology)**  
 Department: **Department of Physics**  
 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
<b>Semester-I (Autumn)</b>									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		<b>Total</b>		<b>13</b>					
<b>Semester-II (Spring)</b>									
1.	PHC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		<b>Total</b>		<b>14</b>					

<b>Summary</b>				
Semester	1	2	3	4
<b>Semester-wise Total Credits</b>	18	21	13	14
<b>Total Credits</b>	<b>66</b>			

**M.Tech. (Solid State Electronic Technology)**

**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.	PHL-541	Materials for Renewable Energy and Storage	PEC	4	3	1	0	3	0
2.	PHL-542	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0
3.	PHL-543	Digital Signal Processing	PEC	4	3	1	0	3	0
4.	PHL-544	Thin Film Technology	PEC	4	3	1	0	3	0
5.	PHL-545	Nanoscience and Nanotechnology	PEC	4	3	1	0	3	0
6.	PHL-546	Functional Properties of Materials & Devices	PEC	4	3	1	0	3	0
7.	PHL-547	Engineered Materials for Device Application	PEC	4	3	1	0	3	0
8.	PHL-548	Semiconductor Micro-electronic Technology	PEC	4	3	1	0	3	0
9.	PHL-549	Nano-electronics and Photonics	PEC	4	3	1	0	3	0
10.	PHL-550	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0
11.	PHL-551	Advance Fuel Cell and Battery Technology	PEC	4	3	1	0	3	0
12.	PHL-552	MEMS and NEMS	PEC	4	3	1	0	3	0
13.	PHL-553	Advanced Ceramics and Composites	PEC	4	3	1	0	3	0

**M.Tech. (Solid State Electronic Technology)**

**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.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0

**DEPARTMENT OF PHYSICS**  
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Tech. (Photonics)**  
 Department: **Department of Physics**  
 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
<b>Semester-I (Autumn)</b>									
1.	PHC-501	Numerical Analysis and Computational Techniques	PCC	3	2	0	2	3	0
2.	PHC-507	Semiconductor Device Physics	PCC	4	3	1	0	3	0
3.	PHC-511	Laboratory Work in Photonics	PCC	3	0	0	6	0	6
4.	PHC-513	Optical Electronics	PCC	4	3	1	0	3	0
5.		Social Science Course	SSC	2	-	-	-	-	-
		<b>Total</b>		<b>16</b>					
<b>Semester-II (Spring)</b>									
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.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		<b>Total</b>		<b>21</b>					

**DEPARTMENT OF PHYSICS  
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Tech. (Photonics)**  
 Department: **Department of Physics**  
 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
<b>Semester-I (Autumn)</b>									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		<b>Total</b>		<b>13</b>					
<b>Semester-II (Spring)</b>									
1.	PHC-701B	Thesis Stage-II	THESIS	14	-	-	-	-	-
		<b>Total</b>		<b>14</b>					

<b>Summary</b>				
Semester	1	2	3	4
<b>Semester-wise Total Credits</b>	16	21	13	14
<b>Total Credits</b>	<b>64</b>			

**M.Tech. (Photonics)**

**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.	PHL-542	Analog Integrated Circuit Design	PEC	4	3	1	0	3	0
2.	PHL-543	Digital Signal Processing	PEC	4	3	1	0	3	0
3.	PHL-549	Nano-electronics and Photonics	PEC	4	3	1	0	3	0
4.	PHL-550	Solar Photovoltaic and Energy Storage	PEC	4	3	1	0	3	0
5.	PHL-554	Radiation Detection and Measurements	PEC	4	3	1	0	3	0
6.	PHL-555	Optical Communication System	PEC	4	3	1	0	3	0
7.	PHL-556	Optical Networks	PEC	4	3	1	0	3	0
8.	PHL-557	Solid State Lighting	PEC	4	3	1	0	3	0
9.	PHL-558	Display Technology	PEC	4	3	1	0	3	0
10.	PHL-559	Photonic Sensors	PEC	4	3	1	0	3	0
11.	PHL-560	Photonic Analysis and Design	PEC	4	3	1	0	3	0
12.	PHL-561	Silicon Photonics	PEC	4	3	1	0	3	0
13.	PHL-562	Quantum Photonics	PEC	4	3	1	0	3	0

**M.Tech. (Photonics)**

**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.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0



**DEPARTMENT OF PHYSICS**  
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Sc. (Physics)**  
Department: **Department of Physics**  
Year: **I**  
Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
<b>Semester-I (Autumn)</b>									
1.	PHC-521	Quantum Mechanics-I	PCC	4	3	1	0	3	0
2.	PHC-523	Advanced Mathematical Physics	PCC	4	3	1	0	3	0
3.	PHC-525	Classical Electrodynamics	PCC	4	3	1	0	3	0
4.	PHC-527	Classical Mechanics	PCC	4	3	1	0	3	0
5.	PHC-529	Atomic, Molecular and Laser Physics	PCC	3	3	0	0	3	0
6.		Social Science Course	SSC	2	-	-	-	-	-
		<b>Total</b>		<b>21</b>					
<b>Semester-II (Spring)</b>									
1.	PHC-531	Condensed Matter Physics	PPI	3	3	0	0	3	0
2.	PHC-533	Statistical Mechanics	PPI	3	3	0	0	3	0
3.	PHC-535	Laboratory Work	PPI	3	0	0	6	0	4
4.	PHC-537	Elements of Nuclear and Particle Physics	PPI	3	3	0	0	3	0
5.	PHC-539	Physics of Earth's Atmosphere	PPI	2	2	0	0	2	0
6.		Science, Technology, and Advanced Research-tools	STAR	3	-	-	-	-	-
7.	PHC-700	Seminar	SEM	2	-	-	-	-	-
		<b>Total</b>		<b>19</b>					

**DEPARTMENT OF PHYSICS**  
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code: **XXX M.Sc. (Physics)**  
 Department: **Department of Physics**  
 Year: **II**  
 Model: **1-A**

Teaching Scheme					Contact Hours/Week			Exam Duration	
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical
<b>Semester-I (Autumn)</b>									
1.	PHC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	PHC-543	Computational Physics	PPI	3	2	0	2	3	0
3.	PHC-545	Semiconductor Devices and Applications	PPI	3	3	0	0	3	0
4.	PHC-547	Quantum Mechanics - II	PPI	3	3	0	0	3	0
5.		Program Elective-I	PPI	4	-	-	-	-	-
6.		Program Elective-II	PPI	3	-	-	-	-	-
7.		Project-I	PROJECT	2					
		<b>Total</b>		<b>21</b>					
<b>Semester-II (Spring)</b>									
1.		Program Elective-III	PEC	4	-	-	-	-	-
2.		Program Elective-IV	PEC	4	-	-	-	-	-
3.	PHC-602	Project-II	PROJECT	9	-	-	-	-	-
		<b>Total</b>		<b>17</b>					

<b>Summary</b>				
Semester	1	2	3	4
Semester-wise Total Credits	21	19	21	17
<b>Total Credits</b>	<b>78</b>			

M.Sc. (Physics)

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.	PHL-502	Physics of Nanosystems	PEC	4	3	1	0	3	0
2.	PHL-504	Fiber and Nonlinear Optics	PEC	4	3	1	0	3	0
3.	PHL-505	Quantum Optics	PEC	4	3	1	0	3	0
4.	PHL-508	Introduction to Superstring Theory	PEC	4	3	1	0	3	0
5.	PHL-510	Advanced Characterization Techniques	PEC	4	3	1	0	3	0
6.	PHL-511	Atomic and Molecular Collision Physics	PEC	4	3	1	0	3	0
7.	PHL-513	Astrophysics	PEC	4	3	1	0	3	0
8.	PHL-514	Solar-Terrestrial Physics	PEC	4	3	1	0	3	0
9.	PHL-515	General Relativity	PEC	4	3	1	0	3	0
10.	PHL-516	Computational Nuclear Physics	PEC	4	3	1	0	3	0
11.	PHL-517	Particle Physics	PEC	4	3	1	0	3	0
12.	PHL-521	Weather Forecasting	PEC	4	3	1	0	3	0
13.	PHL-522	Nuclear Instrumentation	PEC	4	3	1	0	3	0
14.	PHL-523	Physics and Technology of Thin Films	PEC	4	3	1	0	3	0
15.	PHL-524	Advanced Nuclear Reactions	PEC	4	3	1	0	3	0
16.	PHL-525	Semiconductor Photonics	PEC	4	3	1	0	3	0
17.	PHL-526	Advanced Light Sources	PEC	4	3	1	0	3	0

18.	PHL-527	Superconducting Radio Frequency for Particle Accelerators	PEC	4	3	1	0	3	0
19.	PHL-528	Advanced Condensed Matter Physics	PEC	4	3	0	3	3	0
20.	PHL-529	Advanced Atmospheric Physics	PEC	4	3	0	3	3	0
21.	PHL-530	Advanced Laser Physics	PEC	4	3	0	3	3	0
22.	PHL-531	Advanced Nuclear Physics	PEC	4	3	0	3	3	0
23.	PHL-532	Advanced Quantum Field Theory	PEC	4	3	1	0	3	0
24.	PHL-533	Quantum Computing for Many Body Systems	PEC	4	3	1	0	3	0
25.	PHL-534	Nuclear Astrophysics	PEC	3	3	0	0	3	0
26.	PHL-535	Superfluidity and Superconductivity	PEC	3	3	0	0	3	0
27.	PHL-536	Advanced Topics in Mathematical Physics	PEC	3	3	0	0	3	0
28.	PHL-537	Advanced Electroceramics Technology	PEC	3	3	0	0	3	0
29.	PHL-538	A Primer in Quantum Field Theory	PEC	3	3	0	0	3	0
30.	PHL-539	Advanced Atomic and Molecular Physics	PEC	3	3	0	0	3	0
31.	PHL-540	Quantum Theory of Solids	PEC	3	3	0	0	3	0

M.Sc. (Physics)

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.	PHT-501	Advanced Materials for Energy Harvesting and Storage	STAR	3	3	0	0	3	0
2.	PHT-502	Functional Materials	STAR	3	3	0	0	3	0
3.	PHT-503	Fundamentals of Nanoscience and Technology	STAR	3	3	0	0	3	0
4.	PHT-504	Computational Science with Python	STAR	3	2	0	2	3	0
5.	PHT-505	Quantum Simulations	STAR	3	2	0	2	3	0
6.	PHT-506	Superconducting Qubits-based Quantum Computing	STAR	3	3	0	0	3	0