

**DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : **XXX M.Tech. (Computational Materials Engineering)**  
 Department : **Department of Metallurgical and Materials 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
<b>Semester-I (Autumn)</b>									
1.	MTC-501	Mathematics and Numerical Methods	PCC	3	3	0	0	3	0
2.	MTC-503	Structure of Materials	PCC	4	3	1	0	3	0
3.	MTC-505	Atomistic Modelling: Methods and Applications	PCC	3	3	0	0	3	0
4.	MTC-507	Continuum Modelling: Methods and Applications	PCC	3	3	0	0	3	0
5.	MTC-509	Materials Modelling and Simulation Lab	PCC	3	0	0	6	0	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.	MTC-700	Seminar	SEM	2	-	-	-	-	-
		<b>Total</b>		<b>21</b>					

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 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.	MTC-691	Internship Social Activity	ISA	3	-	-	-	-	-
2.	MTC-701A	Thesis Stage-I	THESIS	10	-	-	-	-	-
		<b>Total</b>		<b>13</b>					
<b>Semester-II (Spring)</b>									
1.	MTC-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. (Computational Materials Engineering)**

**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.	MTL-501	Crystal Plasticity Modeling	PEC	4	3	1	0	3	0
2.	MTL-502	Additive Manufacturing: Modeling and Simulation	PEC	4	3	1	0	3	0
3.	MTL-503	Materials Informatics	PEC	4	3	1	0	3	0
4.	MTL-504	Modeling and Simulations of Diffusion-based Processes in Metallurgy	PEC	4	3	1	0	3	0
5.	MTL-511	Principles of Solidification	PEC	4	3	1	0	3	0
6.	MTL-512	Engineering Ceramics	PEC	4	3	1	0	3	0
7.	MTL-513	Principles of Materials Selection	PEC	4	3	1	0	3	0
8.	MTL-514	High Temperature Materials	PEC	4	3	1	0	3	0
9.	MTL-515	Composite Materials	PEC	4	3	1	0	3	0
10.	MTL-516	Diffusion in Solids	PEC	4	3	1	0	3	0
11.	MTL-517	Defects in Crystalline Materials	PEC	4	3	1	0	3	0
12.	MTL-518	Nanotechnology: Materials & Devices	PEC	4	3	1	0	3	0
13.	MTL-519	Advanced Steel Technology	PEC	4	3	1	0	3	0
14.	MTL-520	Physical Metallurgy of Light Metals & Alloys	PEC	4	3	1	0	3	0
15.	MTL-521	Corrosion Protection Methods	PEC	4	3	1	0	3	0
16.	MTL-522	Microsensors, MEMS & Smart Devices	PEC	4	3	1	0	3	0
17.	MTL-523	Electro-Ceramics	PEC	4	3	1	0	3	0
18.	MTL-524	Materials for Renewable Energy	PEC	4	3	1	0	3	0
19.	MTL-525	Biomaterials	PEC	4	3	1	0	3	0
20.	MTL-526	Energy Storage Materials	PEC	4	3	1	0	3	0
21.	MTL-527	Failure Analysis	PEC	4	3	1	0	3	0
22.	MTL-528	Tribology of Engineering Materials	PEC	4	3	1	0	3	0
23.	MTL-529	Non-ferrous Extraction	PEC	4	3	1	0	3	0
24.	MTL-530	Materials Modeling and Simulation	PEC	4	3	1	0	3	0

**M.Tech. (Computational Materials Engineering)**

**Science, Technology, and Advanced Research-tools Basket**

<b>Teaching Scheme</b>					<b>Contact Hours/Week</b>			<b>Exam Duration</b>	
<b>S.No.</b>	<b>Subject Code</b>	<b>Course Title</b>	<b>Subject Area</b>	<b>Credits</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Theory</b>	<b>Practical</b>
1.	MTT-501	Materials for Sustainability	STAR	3	2	1	0	3	0