

### 13. Courses of Study and Scheme of Assessment

#### BE METALLURGICAL ENGINEERING

(2019 Regulations)  
(Minimum credits to be earned: 165)

Course Code	Course Title	Periods / week			Maximum Marks				
		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
<b>SEMESTER 1</b>									
19Y101	Calculus and its Applications	3	1	0	4	50	50	100	BS
19Y102	Physics	3	0	0	3	50	50	100	BS
19Y103	Chemistry	3	0	0	3	50	50	100	BS
19Y104	Introduction to Metals and Minerals	3	0	0	3	50	50	100	PC
19G105	English Language Proficiency	2	1	0	3	50	50	100	HS
19Y110	Engineering Graphics	0	0	4	2	100	0	100	ES
19Y111	Basic Sciences Laboratory	0	0	4	2	100	0	100	BS
19Y112	Engineering Practices	0	0	2	1	100	0	100	ES
19IP15	Induction Programme **	0	0	0	0	-	-	-	MC
<b>Total 26 periods</b>		<b>14</b>	<b>2</b>	<b>10</b>	<b>21</b>	<b>550</b>	<b>250</b>	<b>800</b>	
<b>SEMESTER 2</b>									
19Y201	Complex Variables and Transforms	3	1	0	4	50	50	100	BS
19Y202	Materials Science	3	0	0	3	50	50	100	BS
19Y203	Chemistry of Engineering Materials	3	0	0	3	50	50	100	BS
19Y204	Applied Mechanics	3	1	0	4	50	50	100	ES
19Y205	Problem Solving and C Programming	2	0	0	2	50	50	100	ES
19G___	Language Laboratory Elective	0	0	4	2	100	0	100	HS
19Y210	Fuels and Mineral Dressing Laboratory	0	0	4	2	100	0	100	PC
19Y211	Problem Solving and C Programming Laboratory	0	0	2	1	50	50	100	ES
19Y215	Activity Point Programme *	-	-	-	Grade	-	-	-	MC
<b>Semester 2- Summer Term</b>									
19Y212	Internship <sup>€</sup>	0	0	0	2 <sup>€</sup>	100	0	100	EEC
<b>Total 26 periods</b>		<b>14</b>	<b>2</b>	<b>10</b>	<b>21</b>	<b>600</b>	<b>300</b>	<b>900</b>	

\*\* As per norms

\* As per AICTE Norms; Total 60 hrs; Grade: Completed / Not completed; Not counted for CGPA

CA Continuous Assessment

FE Final Examination

€ This course will be conducted prior to the commencement of the third semester for a period of 3 weeks

£ For internship, one credit is equivalent to minimum 40 hours of work as per norms

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<b>SEMESTER 3</b>									
19Y301	Numerical Methods	2	1	0	3	50	50	100	BS
19Y302	Basics of Electrical and Electronics Engineering	3	0	0	3	50	50	100	ES
19Y303	Design of Machine Elements	3	1	0	4	50	50	100	ES
19Y304	Elements of Physical Metallurgy	3	0	0	3	50	50	100	PC
19O306	Economics for Engineers	3	0	0	3	50	50	100	HS
19Y310	Metallography Laboratory	0	0	4	2	100	0	100	PC
19Y311	Metal Cutting Practices & CIM Laboratory	0	0	4	2	100	0	100	ES
19Y312	Electrical and Electronics Engineering Laboratory	0	0	2	1	50	50	100	ES
19K312	Environmental Science **	2	0	0	0	-	-	-	MC
19Y315	Activity Point Programme *	-	-	-	Grade	-	-	-	MC
<b>Total 28 periods</b>		<b>16</b>	<b>2</b>	<b>10</b>	<b>21</b>	<b>500</b>	<b>300</b>	<b>800</b>	
<b>SEMESTER 4</b>									
19Y401	Probability and Statistics	2	1	0	3	50	50	100	BS
19Y402	Fluid Mechanics and Heat Transfer	3	1	0	4	50	50	100	ES
19Y403	Metallurgical Thermodynamics and Kinetics	3	1	0	4	50	50	100	PC
19Y404	Mechanical Behavior and Testing of Materials	3	0	0	3	50	50	100	PC
19Y405	Production of Iron	3	0	0	3	50	50	100	PC
19Y406	Metal Casting	3	0	0	3	50	50	100	PC
19Y410	Materials Testing Laboratory	0	0	4	2	100	0	100	PC
19O412	Indian Constitution **	2	0	0	0	-	-	-	MC
19Q413	Soft Skills Development	0	0	2	1	100	0	100	EEC
19Y415	Activity Point Programme *	-	-	-	Grade	-	-	-	MC
<b>Total 28 periods</b>		<b>19</b>	<b>3</b>	<b>6</b>	<b>23</b>	<b>500</b>	<b>300</b>	<b>800</b>	

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<b>SEMESTER 5</b>									
19Y501	Phase Transformations and Heat Treatment	3	1	0	4	50	50	100	PC
19Y502	Nonferrous Extraction Metallurgy	2	0	0	2	50	50	100	PC
19Y503	Fracture Mechanics, Fatigue and Creep	3	1	0	4	50	50	100	PC
19Y504	Production of Steel	3	0	0	3	50	50	100	PC
19Y505	Metal Joining	3	0	0	3	50	50	100	PC
19Y506	Materials Characterisation	3	0	0	3	50	50	100	PC
19Y510	Foundry and Welding Laboratory	0	0	4	2	100	0	100	PC
19Y511	Material Characterization and Heat Treatment Laboratory	0	0	4	2	100	0	100	PC
19Q513	Business and Managerial Communications	0	0	2	1	100	0	100	EEC
19Y515	Activity Point Programme *	-	-	-	Grade	-	-	-	MC
<b>Total 29 periods</b>		<b>17</b>	<b>2</b>	<b>10</b>	<b>24</b>	<b>600</b>	<b>300</b>	<b>900</b>	
<b>SEMESTER 6</b>									
19Y601	Ceramics and Composites	3	0	0	3	50	50	100	PC
19Y602	Corrosion and Surface Engineering	3	0	0	3	50	50	100	PC
19Y603	Metal Forming	3	1	0	4	50	50	100	PC
19Y604	Powder Metallurgy	3	0	0	3	50	50	100	PC
19Y____	Professional Elective I	3	0	0	3	50	50	100	PE
19____	Open Elective I	3	0	0	3	50	50	100	OE
19Y610	Forming and Powder Metallurgy Laboratory	0	0	4	2	100	0	100	PC
19Y611	Innovation Practices	0	0	4	2	100	0	100	EEC
19Q613	Quantitative and Reasoning Skills	0	0	2	1	100	0	100	EEC
19Y615	Activity Point Programme *	-	-	-	Grade	-	-	-	MC
<b>Total 29 periods</b>		<b>18</b>	<b>1</b>	<b>10</b>	<b>24</b>	<b>600</b>	<b>300</b>	<b>900</b>	

At the end of 6th semester, the students are required to earn the minimum number of activity points from the AICTE mandated ACTIVITY POINT PROGRAMME to qualify for the award of BE/BTech degree (Refer Section 4 (vii) (c) of 2019 Regulations)

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CA Continuous Assessment

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		Lecture	Tutorial	Practical	Credits	CA	FE	Total	CAT
<b>SEMESTER 7</b>									
19Y701	Nondestructive Testing	3	0	0	3	50	50	100	PC
19Y___	Professional Elective II	3	0	0	3	50	50	100	PE
19Y___	Professional Elective III	3	0	0	3	50	50	100	PE
19Y___	Professional Elective IV	3	0	0	3	50	50	100	PE
19___	Open Elective II	3	0	0	3	50	50	100	OE
19Y710	Nondestructive Testing and Surface Engineering Laboratory	0	0	4	2	50	50	100	PC
19Y720	Project Work I	0	0	4	2	50	50	100	EEC
<b>Total 23 periods</b>		<b>15</b>	<b>0</b>	<b>8</b>	<b>19</b>	<b>350</b>	<b>350</b>	<b>700</b>	
<b>SEMESTER 8</b>									
19Y___	Professional Elective V	3	0	0	3	50	50	100	PE
19Y___	Professional Elective VI	3	0	0	3	50	50	100	PE
19Y820	Project Work II	0	0	8	4	50	50	100	EEC
<b>Total 14 periods</b>		<b>6</b>	<b>0</b>	<b>8</b>	<b>10</b>	<b>150</b>	<b>150</b>	<b>300</b>	

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#### **PROFESSIONAL ELECTIVES**

- 19Y001 Metallurgy of Steels and Nonferrous Alloys
- 19Y002 Metallurgy of Tool Materials
- 19Y003 Structure and Properties of Polymers
- 19Y004 Nanomaterials
- 19Y005 Biomaterials
- 19Y006 Material and Energy Balance in Metallurgy
- 19Y007 Metallurgy of Castings
- 19Y008 Special Forming Processes
- 19Y009 Welding Metallurgy
- 19Y010 Welding Procedures and Qualifications
- 19Y011 Surface Coatings and Modifications
- 19Y012 Additive Manufacturing
- 19Y013 Advanced Nondestructive Testing
- 19Y014 Metallurgical Failure Analysis
- 19Y015 Selection of Materials
- 19Y016 Mathematical Modelling in Metallurgical Engineering
- 19Y017 Computations in Metallurgical Engineering
- 19Y018 Microstructural Simulation

#### **LANGUAGE ELECTIVES**

- 19G001 Communication Skills for Engineers
- 19G002 German- Level A1.1
- 19G003 French Language Level 1
- 19G004 Basic Japanese

#### **ONE-CREDIT COURSES**

##### **METALLURGICAL ENGINEERING**

- 19YF01 Blast Furnace Design and Cast House Practice
- 19YF02 Advanced Cast Irons and Foundry Management

##### **ENGLISH**

- 19GF01 Interpersonal and Organizational Communication
- 19GF02 Human Values Through Literature

##### **HUMANITIES**

- 19OFA1 Export – Import Practices
- 19OFA2 Insurance - Concepts and Practices
- 19OFA3 Public Finance
- 19OFA4 Security Analysis and Portfolio Management
- 19OFA5 Social Entrepreneurship

### Summary of Credit Distribution

<b>BE METALLURGICAL ENGINEERING</b>										
<b>S. No</b>	<b>Course Category</b>	<b>Credits Per Semester</b>								<b>Total Credits</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	
1	HS	3	2	3	0	0	0	0	0	8
2	BS	12	10	3	3	0	0	0	0	28
3	ES	3	7	10	4	0	0	0	0	24
4	PC	3	2	5	15	23	15	5	0	68
5	PE	0	0	0	0	0	3	9	6	18
6	OE	0	0	0	0	0	3	3	0	6
7	EEC	0	0+2	0	1	1	3	2	4	13
8	MC	-	-	-	-	-	-	-	-	-
	<b>TOTAL</b>	<b>21</b>	<b>21+2</b>	<b>21</b>	<b>23</b>	<b>24</b>	<b>24</b>	<b>19</b>	<b>10</b>	<b>165</b>

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