

# Department of Materials Engineering

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## UNDERGRADUATE COURSES

### Curriculum for the Degree of Bachelor of Science in Materials Engineering: *Extractive Metallurgy*

COURSE CODE	COURSE TITLE	CREDITS
<b>Semester I (Fall)</b>		
19-14-101	Calculus I	4
21-10-103	General Chemistry	3
21-10-104	General Chemistry Lab	1
20-10-115	Physics I (Mechanics and Heat Transfer)	3
11-10-110	Introduction to Materials Engineering	1
25-10-111	English Language	3
24-10-101	General Workshop	1
<b>Semester II (Spring)</b>		
19-14-102	Calculus II	4
11-10-251	Physical Chemistry For Materials	3
20-10-116	Physics I Lab	1
20-10-125	Physics II (Electricity and Magnetism)	3
11-10-105	Crystallography	3
15-12-151	Statics	2
15-10-157	Engineering Graphics	2
<b>Semester III (Fall)</b>		
19-14-251	Differential Equations	3
11-10-255	Thermodynamics of Materials	3
20-10-126	Physics II Lab	1
17-10-250	Fundamentals of Electrical Engineering	3
11-12-263	Mineralogy	1
16-12-212	Strength of Materials	3
17-30-150	Fundamentals of Computer Programming	3
<b>Semester IV (Spring)</b>		
19-14-252	Engineering Mathematics	3
11-14-332	Principles of Metals Extraction I	2
11-12-258	Ore Dressing	2
11-10-260	Physical Properties of Materials I	3
11-10-275	Metallography Lab	1
11-10-280	Transport Phenomena	3
19-14-271	Numerical Computations	2
<b>Semester V (Fall)</b>		
11-12-365	Materials Kinetics	3
11-12-333	Principles of Metals Extraction II	2
11-10-310	Casting I	3
11-10-315	Physical Properties of Materials II	2
11-10-320	Mechanical Properties of Materials I	3
21-18-026	Analytical Chemistry	2
25-10-311	English Language for Materials Engineering	1
<b>Semester VI (Spring)</b>		
11-10-300	Corrosion and Oxidation	3
11-10-355	Solidification of Metals	2
11-10-345	Heat Treatment	3
11-10-330	Metal Forming	3
11-10-340	Mechanical Properties of Materials I Lab	1
11-10-405	Technical Writing	1
11-12-362	Ironmaking I	2

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## Semester VII (Fall)

11-12-417	Production of Non-Ferrous Metals	3
11-12-402	Ironmaking II	3
11-12-433	Metals Extraction Lab II	1
11-12-413	Principles of Metals Extraction Lab I	1
11-10-362	Heat Treatment Lab.	1
11-10-430	Project I	3

## Semester VIII (Spring)

11-10-425	Steelmaking	2
11-12-440	Refractories	3
11-10-325	Casting Lab	1

## Elective Courses

Ferroalloys	2
Economics & Industrial Management	2
Welding Metallurgy	3
Powder Metallurgy	2
Fuels and Energy	2
Surface Engineering & Coatings	3
Corrosion & Coatings Lab.	1
Computer Application in Materials Engineering	2
Nonferrous Alloys	2
Design Principles of Industrial Furnaces	2
Modern Techniques in Materials Analysis	2
Advanced Materials	2
Materials Quality Control	3
Materials Thermodynamics II	3

## Curriculum for the Degree of Bachelor of Science in Materials Engineering: *Industrial Metallurgy*

COURSE CODE	COURSE TITLE	CREDITS
<b>Semester I (Fall)</b>		
19-14-101	Calculus I	4
20-10-115	Physics I (Mechanics and Heat Transfer)	3
20-10-116	Physics I Lab	1
11-10-110	Introduction to Materials Engineering	1
25-10-111	English Language	3
24-10-101	General Workshop	1
<b>Semester II (Spring)</b>		
19-14-102	Calculus II	4
21-10-103	General Chemistry	3
20-10-125	Physics II (Electricity and Magnetism)	3
21-10-104	General Chemistry Lab	1
15-12-151	Statics	2
15-10-157	Engineering Graphics	2
<b>Semester III (Fall)</b>		
19-14-251	Differential Equations	3
11-10-105	Crystallography	3
11-10-251	Physical Chemistry for Materials	3
20-10-126	Physics II Lab	1
17-10-250	Fundamentals of Electrical Engineering	3
16-12-212	Strength of Materials	3
17-30-150	Fundamentals of Computer Programming	3
<b>Semester IV (Spring)</b>		
19-14-252	Engineering Mathematics	3
11-10-255	Thermodynamics of Materials	3
11-10-260	Physical Properties of Materials I	3

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11-10-275	Metallography Lab	1
11-10-280	Transport Phenomena	3
19-14-271	Numerical Computations	2
<b>Semester V (Fall)</b>		
11-10-300	Corrosion and Oxidation	3
11-14-305	Metals Extraction I	3
11-10-310	Casting I	3
11-10-315	Physical Properties of Materials II	2
11-10-320	Mechanical Properties of Materials I	3
11-10-355	Solidification of Metals	2
25-10-311	English Language for Materials Engineering	1
<b>Semester VI (Spring)</b>		
11-10-345	Heat Treatment	3
11-10-330	Metal Forming	3
11-14-335	Metals Extraction II	3
11-14-350	Mechanical Properties of Materials II	3
11-10-340	Mechanical Properties of Materials I Lab	1
11-10-362	Heat Treatment Lab.	1
<b>Semester VII (Fall)</b>		
11-10-400	Welding Metallurgy	3
11-10-405	Technical Writing	1
11-14-410	Foundry II	3
11-14-415	Powder Metallurgy	2
11-14-420	Modern Techniques in Materials Analysis	2
11-14-422	Solidification Lab.	1
11-10-430	Project I	3
<b>Semester VIII (Spring)</b>		
11-12-440	Refractories	3
11-14-435	Nondestructive Testing & Lab.	3
11-14-445	Casting Mold Workshop	1
11-10-325	Casting Lab.	1
<b>Elective Courses</b>		
	Metal Forming II	3
	Nonferrous Alloys	2
	Materials Kinetics	3
	Economics & Industrial Management	2
	Corrosion & Coatings Lab.	1
	Surface Engineering & Coatings	3
	Advanced Materials	2
	Computer Application in Materials Engineering	2
	Materials Selection	2
	Die Design	2
	Solid State Physics	3
	Welding Lab.	1
	Material Quality Control	2