

MSE 401: Metallic Materials

<i>Course description:</i>	Major alloy systems and manufacturing processes; materials selection.
<i>Number of credits:</i>	3. This course is required.
<i>Course Coordinator:</i>	I. Dutta
<i>Prerequisites by course:</i>	MSE 201
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Phase equilibrium and phase diagram interpretation.2. Elementary crystallography and crystal structure.3. Metallography.4. Mechanical behavior of materials.5. Inorganic chemistry.
<i>Postrequisites:</i>	None
<i>Textbooks/other required materials:</i>	<ol style="list-style-type: none">1. Hosford, W. <i>Physical Metallurgy</i>, Taylor, 2010.
<i>Course objectives:</i>	<ol style="list-style-type: none">1. The objective of this course is to develop an understanding of the processing of important commercial metals and alloys and to gain an appreciation for the breadth of applications for which metals are used.
<i>Topics covered:</i>	<ol style="list-style-type: none">1. Review of the mechanical behavior of material.2. Review of the binary iron-carbon system.3. Analysis of the heat treatment of steel.4. Discussion of ferrous and nonferrous alloys.5. Discussion of important industrial metal processes, and analyze processing-structure-property relationships.6. Discussion of metals applications and requirements in the microelectronics and storage media industries.
<i>Expected learning outcomes:</i>	<ol style="list-style-type: none">1. Understanding the nature of important families of commercial metals and alloys.2. Understanding the practice of heat treatment.3. Recognition of the effect of processing on microstructure and that of microstructure on properties.4. Understanding the interplay of strength, toughness, and formability in metals and alloys.5. Understanding the structure of metallic thin film microstructures and their relationship to requirements in microelectronics.6. Appreciation of cost and processing.
<i>Class schedule:</i>	Three 50-minute lecture sessions per week, for one semester.
<i>Laboratory schedule:</i>	None

Contribution to meeting the professional component: Engineering Topics

Relationship of course to student outcomes:
 3 strongly supported; 2 supported; 1 minimally supported

Student Outcomes Pre-Fall 2018
 (ABET EC2000)

Student Outcomes Fall 2018 forward
 (ABET EC2019)

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	1	2	3	4	5	6	7	8	9	10	11
3			2	1				1	1		3	2	1		3		3		2			3	2		

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