

COURSE FAB3020: METALLURGY FUNDAMENTALS**Level:** Advanced**Theme:** Materials and Structures**Prerequisite:** FAB1010 Fabrication Tools & Materials**Description:** Students develop fundamental understandings and skills related to metallurgy, and apply these skills to fabrication processes.**Parameters:** Access to a fabrication work centre complete with heat treating equipment, and to instruction from an individual with specialized training in heat treating practices.**Supporting Course:** FAB3010 Materials Testing**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"> identify and describe the fundamental principles of metallurgy and their industrial applications identify the basic alloy components and properties of common alloys apply metallurgical principles, skills and processes to heat treat a component or product 	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"> presentation of a written report that identifies and describes how the principles of metallurgy are applied to improve the quality of a given product 	20
	<ul style="list-style-type: none"> a description of the major alloy elements and properties of four common alloys. <p><i>Assessment Tool</i> <i>Presentations/Reports, CTSPRE</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	20
	<ul style="list-style-type: none"> successful production or repair of a product that requires one or more heat treating process. <p><i>Assessment Tool</i> <i>Assessment Framework: Activity Assessment, FABACT</i></p> <p><i>Standard</i> <i>An acceptable repair or product that has the characteristics of hardness and toughness as specified in the design specifications</i> <i>Performance rating of 3 for each applicable task</i></p>	60

COURSE FAB3020: METALLURGY FUNDAMENTALS (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate basic competencies. 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Orientation</p> <ul style="list-style-type: none"> Metallurgy Metallic Structures Metallurgy Application 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> list and describe the three major fields of metallurgy; i.e., <ul style="list-style-type: none"> extractive mechanical physical metallurgy use the following terms to describe the internal structure of metals; e.g.: <ul style="list-style-type: none"> atomic structure compound solution crystal explain how the principles of metallurgy are used in: <ul style="list-style-type: none"> welding foundry mechanically forming and finishing metals explain the relationship between the properties of a metal and its structure 	<p>Having a good understanding of the basic principles of metallurgy is important for every serious metals student.</p> <p>Student should understand that temperature, time and stress affect the properties of metals.</p> <p>The structure of a metal can be modified by altering its chemical composition alloying and heat treating.</p>

COURSE FAB3020: METALLURGY FUNDAMENTALS (continued)

Concept	Specific Outcomes	Notes
Assessment <ul style="list-style-type: none"><li data-bbox="207 449 444 485">• Quality Control<li data-bbox="207 554 391 621">• Career Preparation	<i>The student should:</i> <ul style="list-style-type: none"><li data-bbox="487 449 1101 516">• research ways to test a product for hardness and toughness<li data-bbox="487 554 1105 621">• prepare a record of completed activities within a portfolio.	A visit to a foundry or a manufacturing plant that produces springs and other machine parts would be helpful.

