

COURSE FAB2110: FORGING FUNDAMENTALS

Level: Intermediate

Theme: Fabrication Processes

Prerequisite: FAB1110 Bar & Tubular Fabrication

Description: Students determine the effects of heating and striking metal to change its shape and internal structure, using forging techniques.

Parameters: Access to a fabrication work centre complete with heating and forging equipment and to instruction from an individual with specialized training in forging practices.

Supporting Course: FAB1100 Fabrication Principles

Curriculum and Assessment Standards

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none">• identify health and safety hazards associated with metal forging, and take preventive measures to avoid accidents and personal injury to self and others• identify and describe the basic tools and processes used in forging• demonstrate basic metal forging skills and practices	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none">• observed performance in a typical work setting, related to:<ul style="list-style-type: none">– appropriate selection and use of personal protective equipment– safe use of a forge and forging tools– maintenance of a clean and tidy workstation– safe handling and storage of tools and materials• accurate written or oral description of a forge; anvil and accessories; identification and description of drawing, tapering, bending, twisting and upsetting processes• application of forging principles to shape a machine tool or other product. <p><i>Assessment Tool</i> <i>Product Assessment: Forge Work, FAB2110-1</i></p> <p><i>Standard</i> <i>The product is to be evenly shaped, finished and heat treated according to the stated specifications.</i> <i>Performance rating of 2 for each applicable task</i></p>	10 20 70

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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"> Forging Hand Forging 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> identify common and machine parts that are made by forging compare the grain structure of a part shaped by forging with one shaped by casting or machining identify and describe the types of hand tools that are used in forging describe the use of: <ul style="list-style-type: none"> hammers tongs sets fullers punches swages observe and note the processes of: <ul style="list-style-type: none"> tapering draw out bending twisting upsetting 	<p>Hand forging is not widely practised in industry; however, the principles learned here are basic to all machine processes.</p>

COURSE FAB2110: FORGING FUNDAMENTALS (continued)

Concept	Specific Outcomes	Notes
<ul style="list-style-type: none"> • Heating • Heat Treating • Drop Forging 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe the parts of a solid fuel or gas-fired forge • explain how temperatures are controlled • describe the chemical reactions that take place between the heating elements and the work piece • describe how the combination of heating and quenching can be used to control the shaping of the metal • describe the processes of hardening, tempering, annealing and normalizing related to forging • compare the process of drop forging with that of conventional forging techniques. 	<p>Discuss the advantages and disadvantages of a gas-fired and solid fuel forge.</p> <p>Heat treating concepts are further developed in Metallurgy Fundamentals (FAB3020).</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> • Health and Safety • Operation Schedule 	<ul style="list-style-type: none"> • identify the appropriate personal protective equipment used in forging • describe the approved start-up and shut-down procedures for a given forge • create a sequence of forging operations by analyzing an existing forged part or shop drawing. 	
<p>Implementation</p>	<ul style="list-style-type: none"> • demonstrate basic forging skills using a variety of forging tools. 	
<p>Assessment</p> <ul style="list-style-type: none"> • Career Information • Career Preparation 	<ul style="list-style-type: none"> • evaluate further local training and employment opportunities as a/an: <ul style="list-style-type: none"> – ornamental iron worker – farrier • prepare a record of completed activities within a portfolio. 	

