

COURSE FAB1130: PRINCIPLES OF MACHINING**Level:** Introductory**Theme:** Production Systems and Processes**Prerequisite:** FAB1010 Fabrication Tools & Materials**Description:** Students develop basic hand and machine tool knowledge, skills and techniques to mechanically remove materials.**Parameters:** Access to a materials work centre complete with drillpress, bench or pedestal grinder and metal lathe, and to instruction from an individual with specialized training in basic machining.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> identify and describe common machineable materials and machining processes 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> accurate identification of three machineable materials and four common machining processes and related tools. <p><i>Assessment Tool</i> <i>Response Assessment: Machining Materials and Processes, FAB1130-1</i></p> <p><i>Standard</i> <i>Response rating of 1</i></p>	10
	<ul style="list-style-type: none"> perform safe set up, operation and shut down of equipment used in drilling, grinding and turning operations <p><i>Assessment Tool</i> <i>Equipment Checklist: Drill Press, FABEQUIP-1</i> <i>Equipment Checklist: Grinder – Bench or Pedestal, FABEQUIP-2</i> <i>Equipment Checklist: Metal Lathe, FABEQUIP-3</i></p> <p><i>Standard</i> <i>All procedures to be performed correctly</i></p>	20

COURSE FAB1130: PRINCIPLES OF MACHINING (continued)

Concept	Specific Outcomes	Notes
<ul style="list-style-type: none"> • Measurement • Machine Operations • Drilling 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe the current systems of measurement used in machining and explain the advantages and disadvantages of each • list and describe common types of: <ul style="list-style-type: none"> – rules – squares – dividers – calipers – micrometers – gauges that are used in connection with machining • research methods of securing stock for purposes of machining; e.g.: <ul style="list-style-type: none"> – chuck – vise – clamp • analyze common hand and machine tool processes of: <ul style="list-style-type: none"> – cutting and shaping – grinding and polishing – threading metal stock • compare the performance of manually operated and computer-controlled equipment in relation to: <ul style="list-style-type: none"> – accuracy – repeatability – reliability – productivity • identify the major components and describe the operation of a drill press • research the design of a typical twist drill and methods of sizing • explain how the proper drill speeds and feeds rate are determined • describe purpose and list the types of lubrication that are used when drilling • list and describe the safety hazards associated with drilling 	<p>Discuss the purpose of each of these tools and explain why it is important to take special care of these measuring devices.</p> <p>Even if CNC equipment is not available, students should have a basic understanding of how this equipment operates.</p>

COURSE FAB1130: PRINCIPLES OF MACHINING (continued)

Concept	Specific Outcomes	Notes
<ul style="list-style-type: none"> • Turning • Abrading 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe the major components and operation of a metal lathe • identify the appropriate cutting tool to face metal stock • explain what is meant by cutting speed, feed rate, depth of cut and how these variables are expressed and controlled • list and describe the safety hazards associated with turning • identify the major components and operation of a bench or pedestal grinder • identify and describe different kinds of grinding wheels • explain why it is important not to overheat thin edges or points, nor to grind soft metals • identify the types and uses of cloth abrasives • list and describe the safety hazards associated with grinding. 	<p>The emphasis in this course should be on facing and straight turning.</p> <p>Emphasize the importance of having the tool rest properly adjusted and proper wheel guards and eye shield in place. A wheel that has become cracked or loose should never be used.</p>
<p>Planning and Management</p> <ul style="list-style-type: none"> • Product Design 	<ul style="list-style-type: none"> • select or modify a product that incorporates: <ul style="list-style-type: none"> – drilling – grinding – turning operations • describe the machining operations and sequence them in a logical and efficient manner. 	<p>Suggested products include:</p> <ul style="list-style-type: none"> – pen base – screw driver – simple mallet – simple puller.
<p>Implementation</p> <ul style="list-style-type: none"> • Machining Processes 	<ul style="list-style-type: none"> • demonstrate basic skills in: <ul style="list-style-type: none"> – measurement and layout – drilling, grinding and turning operations to size, shape and finish a complete product. 	

COURSE FAB1130: PRINCIPLES OF MACHINING (continued)

Concept	Specific Outcomes	Notes
Assessment <ul style="list-style-type: none"><li data-bbox="207 449 443 485">• Quality Control <li data-bbox="207 573 391 638">• Career Preparation	<i>The student should:</i> <ul style="list-style-type: none"><li data-bbox="487 449 1065 548">• research a completed product to determine whether it meets the specified tolerances and quality of finish <li data-bbox="487 573 1105 638">• prepare a record of completed activities within a portfolio.	

