



**Alabama  
Department of  
Postsecondary Education**

**Representing the Alabama Community College System**

**STATEWIDE CAREER/TECHNICAL EDUCATION COURSE ARTICULATION REVIEW MINUTES**

Articulation Agreement Identifier: AUT 151 (2011-1) Identifier is the postsecondary course prefix followed by Plan-of-Instruction version number (e.g.; INT 100 (2005-1)).

Applicable CIP code(s): 15.0613

Postsecondary course prefix, number, and title: AUT 151 – Introduction to Machine Shop I Lab

Secondary course prefix, number, and title: 480701/540041 - Introduction to Precision Machining + 480708/540048 - Introduction to Milling + 480707/540047 - Drill Press, and Surface Grinder, Introduction to Lathe

Initial Review: Sept 17, 2009 DPE Annual Review: January 30, 2012

Effective date: Fall Semester 2011.

Course Content Analysis (all postsecondary course objectives must be sufficiently addressed in the secondary courses):

**Notes:**

- 1 Skills and knowledge contained in the postsecondary course objectives must be present in the corresponding secondary objectives for a “match” to occur.**
- 2. Postsecondary and Secondary objectives must reflect similar content and performance levels before the course articulation agreement will be recommended to the TEDAC Oversight Committee.**
- 3. More than one Secondary course may be used in order to articulate to a Postsecondary course.**



Postsecondary Course Objectives	Secondary Course(s) and Objectives	TEDAC Comments
<p>activities.</p> <p><b>Competency:</b> A3.0 Use and maintain common machine shop tools. <b>Performance Objective:</b> - None <b>Learning Objectives:</b> A3.1.1 Identify common and specialty tools used in a machine shop. A3.1.2 Match the proper tool to its use. A3.1.3 Describe procedures for effective maintenance of machine shop tools.</p>		<p>domain competency.</p>
<p><b>MODULE B – POWER SAW OPERATIONS</b></p> <p><b>Competency:</b> B1.0 Set up and operate a power saw. <b>Performance Objective:</b> B1.1 Perform specified cuts using a power saw. <b>Learning Objectives:</b> B1.1.1 Identify common types of power saws found in machine shops. B1.1.2 Match the saw blade to its application. B1.1.3 Identify the major components of a power saw and their functions. B1.1.4 Describe how to set up a power saw for safe operations. B1.1.5 Describe considerations for determining proper speeds for various power saw applications. B1.1.6 Describe how to perform various types of cuts using a power saw. B1.1.7 Estimate the amount of material needed for a project. B1.1.8 Describe how to layout materials for a sawing application.</p>	<p><b>Introduction to Precision Machining</b> <b>Unit 6 – 7 – Power Saws</b> <b>Content Standard(s)</b> 6. Demonstrate care and safety for vertical and horizontal power saws. 7. Demonstrate saw operations, including installing a saw blade, straight cutting a work piece, sawing an angle, and sawing a slot on a vertical saw. <b>Learning Objectives:</b> 1. Know safe power saw practices. 2. Practice proper maintenance and care for the power saw. 3. Learn multiple saw operations (content standard).</p>	

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<p><b>MODULE C – BASIC LATHE OPERATIONS</b>  <b>Competency:</b>                      C1.0 Set up and operate a lathe.  <b>Performance Objective:</b>                      C1.1 Manufacture a part using a lathe.  <b>Learning Objectives:</b>                      C1.1.1 Identify common types of lathes found in machine shops.                      C1.1.2 Match the tool shaping to its lathe application.                      C1.1.3 Identify the major components of a lathe and their functions.                      C1.1.4 Describe how to set up a lathe for safe operations.                      C1.1.5 Describe proper speeds for various lathe applications.                      C1.1.6 Describe how to perform various functions using a lathe.</p>	<p><b>Introduction to Lathe</b>  <b>Unit 2-3 – Lathe Operations</b>  <b>Content Standard(s)</b>                      2. Demonstrate engine lathe operations, including mounting the chuck on the lathe, indicating the round stock in an independent jaw chuck, indicating the square stock in an independent jaw chuck, sharpening the lathe tool bit, centering or positioning cutting tools, face cutting a work piece, turning multiple diameters, center drilling a work piece, demonstrating angle cuts, knurling a work piece, threading a work piece, calculating speed and feed per material, and tooling.                      3. Demonstrate the ability to turn stock to specifications using a variety of methods and materials related to lathe operations.  <b>Learning Objective(s)</b>                      1. Demonstrate safe operation and set up of an engine lathe.                      2. Indicate round and irregular shaped work pieces in a independent 4 jaw chuck.                      3. Perform multiple cutting operations.                      4. Calculate surface speed and feed and determine RPM for turning operations.  <b>Unit 4-5 – Project</b>  <b>Content Standard(s)</b>                      4. Demonstrate the ability to produce a completed lathe project according to specifications.                      5. Demonstrate use of measuring tools, including calipers, dial indicators, and micrometers to produce precision lathe projects.  <b>Learning Objective(s)</b>                      1. Complete NIMS Level I chucking part.                      2. Interpret blueprints for project completion.</p>	

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	3. Utilize precision measuring instruments, to obtain dimensional accuracy.	
<p><b>MODULE D – GRINDING MACHINE OPERATIONS</b>  <b>Competency:</b>                      D1.0 Set up and operate a grinding machine.  <b>Performance Objective:</b>                      D1.1 Manufacture a part using a grinding machine.  <b>Learning Objectives:</b>                      D1.1.1 Identify common types of grinders found in machine shops.                      D1.1.2 Match the grinding wheel to its application.                      D1.1.3 Explain how to ring test a grinding wheel.                      D1.1.4 Explain the function of the major components of a grinder.                      D1.1.5 Describe how to set up a grinder for safe operations.                      D1.1.6 Determine proper speeds and feeds for various grinding applications.                      D1.1.7 Describe how to perform safe grinding functions.</p>	<p><b>Introduction to Milling, Drill Press, and Surface Grinder</b>  <b>Unit 5-6 – Surface Grinder Safety and Operations</b>  <b>Content Standard(s)</b>                      5. Explain care and safety for a surface grinder.                      6. Demonstrate grinding techniques, including mounting a grinding wheel, dressing a grinding wheel, grinding a flat surface, and grinding a work piece square and parallel.  <b>Learning Objective(s)</b>                      1. Utilize safe operation and maintenance procedures (lubrication, no air blast cleaning).                      2. Properly set up and prepare for grinding operations.                      3. Execute precision grinding techniques.</p>	
<p><b>MODULE E – MILLING MACHINE OPERATIONS</b>  <b>Competency:</b>                      E1.0 Set up and operate a milling machine.  <b>Performance Objective:</b>                      E1.1 Manufacture a part using a milling machine.  <b>Learning Objectives:</b>                      E1.1.1 Identify common types of milling machines found in machine shops.                      E1.1.2 Identify the major components of a milling machine and their functions.                      E1.1.3 Describe how to set up a milling machine for safe</p>	<p><b>Introduction to Milling, Drill Press, and Surface Grinder</b>  <b>Unit 1 – 4 – Mill Safety and Operation</b>  <b>Content Standard(s)</b>                      1. Apply safety rules, regulations, and procedures related to milling, drill press, and surface grinder applications.                      2. Explain the care and safety for milling machines.                      3. Demonstrate types of milling cutters and applications, including center drill, drill, reamer, taps, end mills, fly cutter, and carbide insert cutters.                      4. Demonstrate milling machine operations, including</p>	

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<p>operations.</p> <p>E1.1.4 Determine proper speeds for various basic milling applications..</p> <p>E1.1.5 Describe how to safely perform various functions while using a milling machine.</p>	<p>verifying that a machining vice is true to machine axis, verifying that the machine head is perpendicular to the machine table, using work piece clamping techniques, milling a flat surface, milling steps in a work piece, performing slot milling, milling a square block, calculating speed and feed per material and tooling, and milling a pocket in a work piece.</p> <p><b>Learning Objective(s)</b></p> <ol style="list-style-type: none"> <li>1. Explain the role that safety plays in the classroom/lab (machine shop).</li> <li>2. Explain the appropriate safety precautions applicable to common manufacturing facilities.</li> <li>3. Demonstrate the use and care of appropriate personal protective equipment (PPE).</li> <li>4. Properly don and remove personal protective equipment (safety goggles, hearing protection, and hard hat).</li> <li>5. Explain the importance of Hazard Communications (HazCom) and material safety data sheets (MSDS).</li> <li>6. Describe fire prevention and firefighting techniques.</li> <li>7. Demonstrate correct selection and use of hand tools.</li> <li>8. Identify various mill cutters.</li> <li>9. Properly align head and attachments.</li> <li>10. Perform basic milling operations.</li> <li>11. Perform basic machining calculations.</li> <li>12. Perform preventative maintenance on mill.</li> </ol>	

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<p><b>MODULE F – DRILL PRESS OPERATIONS</b></p> <p><b>Competency:</b>                      F1.0 Set up and operate a drill press.                      Performance Objective:                      F1.1 Given specifications, manufacture a part using a drill press.</p> <p><b>Learning Objectives:</b>                      F1.1.1 Identify common types of drill presses found in machine shops.                      F1.1.2 Match the drill bit to various applications.                      F1.1.3 Identify the major components of a drill press and their functions.                      F1.1.4 Describe how to set up a drill press for safe operation.                      F1.1.5 Describe considerations for determining proper speeds for various drill press applications.</p>	<p><b>Introduction to Precision Machining</b>  <b>Unit 4-5 – Drill Press</b>  <b>Content Standard(s)</b>                      4. Demonstrate care and safety for a drill press.                      5. Demonstrate drill press operations to include hand sharpening a drill bit, center drilling and drilling a work piece, countersinking a hole, counter boring a hole, and calculating speed and feed per material and tooling.</p> <p><b>Learning Objective(s)</b>                      1. Learn proper care and safety of a drill press (maintenance, lubrication, etc.).                      2. Know proper techniques for sharpening a drill bit.                      3. Know how to determine speeds/feeds.                      4. Perform drilling operations (countersinking, counterboring, spotfacing, centerdrilling, etc).</p> <p><b>Introduction to Milling, Drill Press, and Surface Grinder</b>  <b>Unit 7-9 – Drill Press Safety and Operations</b>  <b>Content Standard(s)</b>                      7. Demonstrate care and safety for a drill press.                      8. Demonstrate drill press techniques.</p> <p>9. Demonstrate a hardness test on a work piece, including a file test and a Rockwell hardness test.</p> <p><b>Learning Objective(s)</b>                      1. Utilize safe operating and maintenance procedures.                      2. Center drill, counter boring, countersinking, spot facing, etc.                      3. Evaluate hardness of various materials to be drilled (file, test, spark test, hardness tester).</p>	