Alabama Department of Postsecondary Education

Representing the Alabama Community College System

STATEWIDE CAREER/TECHNICAL EDUCATION COURSE ARTICULATION REVIEW MINUTES

Articulation Agreement Identifier: AUT 186 (2011-1) Identifier is the postsecondary course prefix followed by Plan-of-Instruction version number (e.g.; INT 100 (2007-1)).

Applicable CIP code(s): 15.0613

Postsecondary course prefix, number, and title: AUT 186 - Principles of Industrial Maintenance Welding and Metal Cutting Techniques

Secondary Education course(s) title and number: 431601/430070 - Introduction to Welding

Initial Review: October 15, 2009 DPE Annual Review: January 30, 2012

Effective dates: **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.**

Articulation Agreement Identifier: AUT 186 (2011-1)

Postsecondary Course Objectives	Secondary Courses and Objectives	TEDAC Comments
MODULE A – SAFETY AND PRINT READING **Competency:** A1.0 Perform tasks in a safe manner. **Performance Objective:** A1.1 Given a variety of lab situations, perform assigned tasks in a safe manner. **Learning Objectives:** A1.1.1 Explain the importance of safety policies. A1.1.2 Describe the use of personal protective equipment. A1.1.3 Explain Lock Out/Tag Out procedures. A1.1.4 Explain good housekeeping practices. A1.1.5 Explain the importance of performing machine safety checks of equipment and accessories. A1.1.6 Explain the importance of using safe material handling techniques for lifting, transporting, and storing. A1.1.7 Explain the importance of practicing tool safety. **Competency:** A2.0 Read and interpret blueprints and mechanical drawings. **Performance Objective – None** **Learning Objectives:** A2.1.1 Identify alphabet of lines. A2.1.2 Identify common welding symbols found on various types of prints. A2.1.4 Read and interpret types of lettering and dimensions. A2.1.3 Locate and interpret various sections of and orthographic projection drawing. A2.1.5 Read and interpret auxiliary views. A2.1.6 Read and interpret detail drawings. A2.1.7 Read and interpret assembly drawings. A2.1.8 Read and interpret geometric tolerances. A2.1.9 Read and interpret section views and details. A2.1.10 Read and interpret pictorial drawings.	**Introduction to Welding** **Unit 2 – Safety** **Content Standard(s)** 2. Summarize rules and regulations related to the welding industry. • Describing personal protection equipment used by welders • Demonstrating ways to avoid welding fumes • Explaining uses for Materials Safety Data Sheets (MSDS) related to welding • Explaining ways to avoid electrical hazards when welding **Learning Objective(s)** 1. Identify types of personal safety equipment. 2. Explain why clothing made of synthetic fibers should not be worn when welding. 3. Explain safety regarding cylinders. 4. Explain safety procedures for lighting a torch. 5. Discuss equipment/shop safety procedures. 6. Identify common hazards within the shop/lab area. 7. Identify and explain warning signs that should be posted in the shop/lab area. 8. Explain the importance of good housekeeping in the shop. 9. Discuss shop cleaning procedures. 10. Explain procedures for first aid. 11. Explain the importance of storing materials in proper manner. 12. Discuss what to do if an accident happens. **Unit 7-9 – Drawing** **Content Standard(s)** 7. Interpret welding specifications in blueprints and drawings. • Identifying measuring tools and instruments used in welding	

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	8. Interpret types of lines on welding drawings, including object, visible, hidden, leader, extension, dimension, and center. 9. Interpret basic views on a welding drawing, including pictorial, top, front, sides, back, and detailed. **Learning Objective(s)** 1. Identify and explain a welding detail drawing. 2. Identify and explain lines, material fills, and sections. 3. Identify and explain object views. 4. Identify and explain dimensioning. 5. Identify and explain notes and bill of materials. 6. Interpret basic elements of a welding detail drawing. 7. Develop basic welding drawings. **Unit 10-11 – Welding Symbols** **Content Standard(s)** 10. Explain various parts of a welding symbol. 11. Draw welding symbols based on the observation of actual welds. **Learning Objective(s)** 1. Identify and explain the various parts of a welding symbol. 2. Identify and explain fillet and groove weld symbols. 3. Read welding symbols on drawings, specifications, and welding procedure specifications. 4. Interpret welding symbols from a print. 5. Draw welding symbols based on the observation of actual welds.	

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MODULE B – WELDING PRACTICES **Competency:** B1.0 Use gas welding equipment. **Performance Objective:** B1.1 Setup gas welding equipment and perform various types of welds in various positions. **Learning Objectives:** B1.1.1 Identify components of gas welding equipment. B1.1.2 Summarize the process of setup of gas welding equipment. B1.1.3 Describe the process of preparing the work piece for gas welding. B1.1.4 Summarize the process of gas welding. B1.1.5 Describe considerations for determining gas weld integrity. **Competency:** B2.0 Use electrical welding equipment. **Performance Objective:** B2.1 Setup electrical welding equipment and perform various types of welds in various positions. **Learning Objectives:** B2.1.1 Identify components of electric welding equipment B2.1.2 Summarize the process of setup of electrical welding equipment B2.1.3 Describe the process of preparing the work piece for electrical welding B2.1.4 Summarize the process of electrical welding B2.1.5 Describe considerations for determining electrical weld integrity.	**Unit 3-6 - Basic Shielded Metal Arc Welding** **Content Standard(s)** 3. Demonstrate operation of shielded metal arc welding (SMAW) equipment. 4. Demonstrate tapping and scratching methods for striking and maintaining an arc. 5. Demonstrate correct methods for welding a pad of beads with an E6010 and an E7018 electrode in flat, horizontal, vertical, and overhead positions. 6. Select the proper electrode for an identified welding task. • Identifying factors that affect electrode selection **Learning Objective(s)** 1. Identify and explain shielded metal arc welding (SMAW) safety. 2. Identify and explain welding electrical current. 3. Identify and explain arc welding machines. 4. Explain setting up arc welding equipment. 5. Set up a machine for welding. 6. Identify and explain tools for weld cleaning. 7. Set up shielded metal arc welding (SMAW) equipment. 8. Describe methods of striking an arc. 9. Properly strike and extinguish an arc. 10. Describe causes of arc blow and wander. 11. Make stringer, weave, and overlapping beads. 12. Make fillet welds in the: • Horizontal (2F) position • Vertical (3F) position • Overhead (4F) position 13. Identify factors that affect electrode selection. 14. Explain the American Welding Society (AWS) and the American Society of Mechanical Engineers (ASME) filler metal classification system. 15. Identify different types of filler metals.	

Postsecondary Course Objectives	Secondary Courses and Objectives	TEDAC Comments
	16. Explain the storage and control of filler metals. 17. Explain filler metal traceability requirements and how to use applicable code requirements. 18. Identify and select the proper electrode for an identified welding task.	
MODULE C – OXY-FUEL CUTTING PRACTICES **Competency:** C1.0 Use Oxy-Fuel cutting equipment. **Performance Objective:** C1.1 Setup oxy-fuel cutting equipment to perform cuts on various types of metals. **Learning Objectives:** C1.1.1 Identify components of oxy-fuel equipment. C1.1.2 Explain special safety precautions for oxy-fuel equipment. C1.1.3 Summarize the process of setting up oxy-fuel equipment. C1.1.4 Summarize the process of lighting and adjusting the torch for oxy-fuel equipment. C1.1.5 Describe considerations for performing various techniques for oxy-fuel cutting.	**Unit 12-13 – Oxyfuel Cutting** **Content Standard(s)** 12. Demonstrate safety techniques for setting up and using oxy-fuel cylinders and equipment. 13. Perform a variety of oxy-fuel gas cutting tasks to specification. **Learning Objective(s)** 1. Identify and explain the use of oxyfuel cutting equipment. 2. Set up oxyfuel equipment. 3. Light and adjust an oxyfuel torch. 4. Shut down oxyfuel cutting equipment. 5. Disassemble oxyfuel equipment. 6. Change empty cylinders. 7. Perform oxyfuel cutting: • Straight line and square shapes • Piercing and slot cutting • Bevels • Washing • Gouging 8. Operate a motorized, portable oxyfuel gas cutting machine.	