Alabama Department of Postsecondary Education

Representing the Alabama Community College System

STATEWIDE CAREER/TECHNICAL EDUCATION COURSE ARTICULATION REVIEW MINUTES

Articulation Agreement Identifier: ADM 105 (2009-1) 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: ADM 105 – Fluid Systems

Secondary Course(s) of Study: 480301/540011 - Industrial Systems and Maintenance I + 480302/540012 - Industrial Systems and Maintenance II + 480303/540013 - Industrial Systems and Maintenance III + 480302/540014 - Industrial Systems and Maintenance IV

Initial Review: November 17, 2009 Annual DPE Review: January 25, 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.**

Postsecondary Course Objectives	Secondary Course(s) and Location(s)	TEDAC Comments
Module A **Competencies:** A1.0 Explain the theory related to hydraulic and pneumatic systems Maintain hydraulic systems **Performance Objectives:** A1.1 Answer questions related to basic hydraulic and pneumatic principles used in an industrial system **Learning Objectives:** A1.1.1 Explain the safety precautions necessary when working on hydraulic and pneumatic systems A1.1.2 Explain how to use the proper lockout/tagout procedures used in an industrial setting A1.1.3 Given the parameters of hydraulic and pneumatic systems, calculate the developed pressure and/or force A1.1.4 Apply Pascal's Law in calculating and solving problems in a system A1.1.5 Apply Bernoulli's Principle in solving problems in a system A1.1.6 Differentiate between the fluids used in hydraulic and pneumatic systems A1.1.7 Explain the common problems found in both hydraulic and pneumatic systems including contamination, corrosion, and oxidation A1.1.8 Calculate the capacity, speed and efficiency of hydraulic and pneumatic systems A1.1.9 Determine the size of piping used in hydraulic and pneumatic systems A1.1.10 Explain how to properly install piping used in hydraulic and pneumatic systems	**Industrial Systems and Maintenance II, Unit 13-16, Hydraulics** **Content Standards** 13. Demonstrate safety procedures as prescribed by approved industry standards. 14. Explain the principles of hydraulic theory relative to industrial maintenance. • Defining units of pressure • Defining properties of hydraulic fluids 15. Explain pressure and flow relative to the operation of hydraulic systems. • Identifying types of pumps, motors, valves and cylinders • Defining properties of hydraulic fluids 16. Explain common maintenance tasks used to prevent hydraulic system failures. **Learning Objectives** 1. Explain safe handling of hydraulic fluids, cylinders, control valves and hoses. 2. Demonstrate hydraulic practices that apply to industry. 3. Identify the location of MSDS on hydraulic fluids used in the shop. 4. Explain pressure flow relative to the operation of hydraulic systems. 5. List the types of pumps, motors, valves and cylinders found in industry. 6. Explain preventative maintenance techniques for hydraulic systems. 7. Demonstrate troubleshooting practices for hydraulic systems. 8. Explain fluid filtration.	

Postsecondary Course Objectives	Secondary Course(s) and Location(s)	TEDAC Comments
Module B **Competencies:** B1.0 Install, maintain, troubleshoot, and repair/replace a hydraulic system. **Performance Objectives:** B1.1 Given a hydraulic system drawing/schematic, install, maintain, and troubleshoot the system and repair/replace appropriate components. **Learning Objectives:** B1.1.1 Use the appropriate safety precautions when working with fluid systems B1.1.2 Differentiate the types of hydraulic pumps used for various applications, including vane, gear and piston pumps B1.1.3 Install the different types of hydraulic pumps, including vane, gear and piston pumps B1.1.4 Maintain the different types of hydraulic pumps, including vane, gear and piston pumps B1.1.5 Troubleshoot and repair/replace the different types of hydraulic pumps used in an industrial setting, including vane, gear and piston pumps B1.1.6 Differentiate the different types of hydraulic valves used for various applications, including check valves, flow control valves, pressure values and directional valves B1.1.7 Install the different hydraulic valves, including check valves, flow control valves, pressure values and directional valves B1.1.8 Maintain the different hydraulic valves, including check valves, flow control valves, pressure values and directional valves B1.1.9 Troubleshoot and repair/replace the different hydraulic valves, including check valves, flow control valves, pressure values and directional valves B1.1.10 Differentiate the different types of hydraulic actuators used for various applications, including cylinders and motors B1.1.11 Install the different types of hydraulic actuators, including cylinders and motors	**Industrial Systems and Maintenance IV, Unit 11-12, Troubleshooting and Repairing Hydraulic Equipment Content Standards** 11. Inspect hydraulic system equipment for system function. 12. Explain basic hydraulic principles to be considered before troubleshooting hydraulic-driven equipment. **Learning Objectives** 1. Demonstrate troubleshooting skills for hydraulic systems. 2. Explain the functions of a hydraulic system. 3. Demonstrate hydraulic principles for troubleshooting driven equipment. 4. Explain possible problems to be solved through troubleshooting skills.	

Postsecondary Course Objectives	Secondary Course(s) and Location(s)	TEDAC Comments
B1.1.12 Maintain the different types of hydraulic actuators, including cylinders and motors B1.1.13 Troubleshoot and repair the different types of hydraulic actuators including cylinders and motors B1.1.14 Using a schematic/wiring diagram, install an electric over hydraulic control circuit B1.1.15 Using a schematic/wiring diagram, troubleshoot and repair/replace an electric over hydraulic control circuit B1.1.16 Using a piping diagram, install, maintain, and repair/replace the piping required in a hydraulic system		
Module C **Competencies:** C1.0 Install, maintain, troubleshoot, and repair/replace a pneumatic system **Performance Objectives:** C1.1 Given a pneumatic system drawing/schematic, install, maintain, and troubleshoot the system and repair/replace appropriate components **Learning Objectives:** C1.1.1 Use the appropriate safety precautions when working with fluid systems C1.1.2 Differentiate the types of pneumatic pumps used for various applications, including vane, gear and piston pumps C1.1.3 Install the different types of pneumatic pumps, including vane, gear and piston pumps C1.1.4 Maintain the different types of pneumatic pumps, including vane, gear and piston pumps	**Industrial Systems and Maintenance I, Unit 22-26, Pneumatics** **Content Standards** 22. Explain compressed air theory relative to industrial maintenance. • Defining units of pressure and volume • Defining the properties of gases, including isothermic, isobaric, isochoric, and standard volume 23. Explain pressure and flow including Bernoulli's principle. 24. Identify types of air compressors and compressor accessories. Examples: reciprocating, rotary, air receivers, inlet filter 25. Explain air humidity and air dehydration, including after-coolers and air dryers. 26. Describe the operation and function of various actuators.	

Postsecondary Course Objectives	Secondary Course(s) and Location(s)	TEDAC Comments
C1.1.5 Troubleshoot and repair/replace the different types of pneumatic pumps used in an industrial setting, including vane, gear and piston pumps C1.1.6 Differentiate the different types of pneumatic valves used for various applications, including check valves, flow control valves, pressure values and directional valves C1.1.7 Install the different pneumatic valves, including check valves, flow control valves, pressure values and directional valves C1.1.8 Maintain the different pneumatic valves, including check valves, flow control valves, pressure values and directional valves C1.1.9 Troubleshoot and repair/replace the different pneumatic valves, including check valves, flow control valves, pressure values and directional valves C1.1.10 Differentiate the different types of pneumatic actuators used for various applications, including cylinders and motors C1.1.11 Install the different types of pneumatic actuators, including cylinders and motors C1.1.12 Maintain the different types of pneumatic actuators, including cylinders and motors C1.1.13 Troubleshoot and repair the different types of pneumatic actuators including cylinders and motors C1.1.14 Using a schematic/wiring diagram, install an electric over pneumatic control circuit C1.1.15 Using a schematic/wiring diagram, troubleshoot and repair/replace an electric over pneumatic control circuit C1.1.16 Using a piping diagram, install, maintain, and repair/replace the piping required in a pneumatic system	**Learning Objectives** 1. Identify properties of gases. 2. Explain compressed air theory relative to industrial maintenance. 3. Identify units related to pressure and volume. 4. Explain Bernoulli's Principle. 5. Describe types of compressors and accessories. 6. Explain air humidity and air dehydration, including after-coolers and air dryers. 7. Identify different types of actuators and their applications. **Industrial Systems and Maintenance III, Unit 3-8, Basic Pneumatic Systems** **Content Standards** 3. Explain pneumatic safety and physical characteristics of gases. 4. Explain the pneumatic transmission of energy related to basic pneumatic systems. 5. Explain principles of compressor operation and compressed gases. 6. Explain various types of compressors used in pneumatic systems. 7. Explain compressed-air treatment used in pneumatic systems. 8. Explain pneumatic system components and symbols used in pneumatic systems. **Learning Objectives** 1. Demonstrate pneumatic safety procedures.	

Postsecondary Course Objectives	Secondary Course(s) and Location(s)	TEDAC Comments
	2. Describe the physical characteristics of gases. 3. Explain the pneumatic transmission of energy related to basic pneumatic systems. 4. List the principles of compressor operation and compressed gasses. 5. Identify various types of compressors used in pneumatic systems. 6. Describe compressed-air treatment used in pneumatic systems. 7. Identify pneumatic system components and symbols used in pneumatic systems. **Industrial Systems and Maintenance IV, Unit 10, Troubleshooting and Repairing Pneumatic Equipment Content Standards** 10. Perform pneumatic system preventive maintenance procedures. **Learning Objectives** 1. Demonstrate how to inspect pneumatic systems for leaks and possible problems. 2. Explain the purpose of proper lubrication in pneumatic systems. 3. Demonstrate the ability to inspect system components for deterioration and damage.	