9/3/2024 DATE

☑ REQUIRED COURSE
☐ ELECTIVE COURSE

TEC DIVISION

☑ NEW COURSE
☐ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	AETC-041		**TITLE:** *(30 Characters Max)*	Pneumatic Systems I							
SEM CR HRS:	0.5	**Lecture:**	0.0	**Lab:**	0.5	**ICCB Lab:**	0.5	**ECH:**	0.5		
Course Level:	☐ Gen Ed/IAI ☐ Baccalaureate/Non-IAI ☑ Career/Technical ☐ Dev Ed/Not in Degree Audit			**Clinical Practicum:**	0.0	**Work-based Learning:**	0.0	**WBL ECH:**	0.0		
Course PCS & CIP:	12 - 15.0403		**IAI Code:**	N/A				**Contact Hours (Minutes/Week)**			
Repeatable (Y/N):	N	**Pass/Fail (Y/N):**	N	**Variable Credit (Y/N):**	N	**Min:**		**Max:**		**16 Wks**	25	**8 Wks**	50
Prerequisites:	None										
Corequisites:	None										
Catalog Description: (40 Word Limit)	Topics covered are pneumatic safety, connection and adjustment of supply lines and pneumatic circuits, air compressor starting, pneumatic schematics, adjusted flow, monitoring performance and system operations and basic servicing. (Meets SACA Automation Specialist I C-209 Pneumatic Systems 1 credential.)										

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Standard 209.1 Apply pneumatic system safety procedures	1	0.5		
Standard 209.2 Connect and adjust a pneumatic supply line	0.5	1.5		
Standard 209.3 Start up and shut down a reciprocating air compressor	0.75	2		
Standard 209.4 Interpret pneumatic schematics	1	2		
Standard 209.5 Connect and operate basic pneumatic circuits	0.5	1		
Standard 209.6 Connect and adjust flow control and needle valves	0.75	2		
Standard 209.7 Monitor performance of pneumatic system pressure and force	1	1		
Standard 209.8 Monitor pneumatic system operation	1	1		
Standard 209.9 Perform basic pneumatic system servicing	0.75	2		
TOTAL	7.25	13	0	0

EVALUATION							
QUIZZES	☑	EXAMS	☑	ORAL PRES	☑	PAPERS	☑
LAB WORK	☑	PROJECTS	☐	COMP FINAL	☑	OTHER	☐

COURSE MATERIALS		
TITLE:	Fluid Power with Applications	Understanding Basic Pneumatics(Mechanical Systems)
AUTHOR:	Anthony Esposito	
PUBLISHER:	Pearson Prentice Hall	TPC Training Systems Division of Technical Publishing Co.
VOLUME/EDITION/URL:	7th Edition	
COPYRIGHT DATE:	2009	

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Standard 209.1 Apply pneumatic system safety procedures	1.5	Performance Indicators 1. Identify and correct pneumatic system hazards. Knowledge Indicators 1. Describe PPE and safe dress for operation of pneumatic systems. 2. Describe types of pneumatic system hazards ID potential injuries/hazards. 3. Describe pneumatic system safety guidelines. 4. Define pneumatics and give applications.

Standard 209.2 Connect and adjust a pneumatic supply line	2	Performance Indicators 1. Connect an air hose that uses quick-connect fittings. 2. Operate pneumatic branch line shutoff valve. 3. Adjust pressure regulator to specified operating pressure. 4. Read a pressure gauge. Knowledge Indicators 1. Describe the operation/construction of a pneumatic regulator. 2. Describe the components of a pneumatic branch line. 3. Define pneumatic pressure and give SI and US Customary units. 4. Compare types of fittings. 5. Describe operation/construction of a pressure gauge.
Standard 209.3 Start up and shut down a reciprocating air compressor	2.75	Performance Indicators 1. Perform startup and normal shutdown of an air compressor. 2. Adjust air compressor pressure switch. 3. Drain an air compressor. Knowledge Indicators 1. Describe how compressed air is generated and its characteristics. 2. Describe the operation/components of a reciprocating air compressor. 3. Describe how air compressor flow capacity is measured. 4. Define absolute and gage units of pressure measurement. 5. Define the combined gas law and explain its importance.
Standard 209.4 Interpret pneumatic schematics	3	Performance Indicators 1. Interpret a pneumatic schematics in NFPA/ISO symbols. Knowledge Indicators 1. Describe the guidelines for drawing pneumatic schematics. 2. Describe the operation/construction of basic pneumatic circuits, directional valves (2/3/5 way; 2-3 position), cylinders (single and double active), motors, and conductors. 3. Describe the NFPA/ISO pneumatic component schematic symbols.
Standard 209.5 Connect and operate basic pneumatic circuits	1.5	Performance Indicators 1. Connect a pneumatic circuit given a schematic. 2. Operate a basic pneumatic valve circuit with manual operator. 3. Use pneumatic valve manual overrides to test actuators. 4. Adjust the stroke length of a pneumatic cylinder. 5. Connect and disconnect pneumatic hoses using push-lock fittings. 6. Install a subplate-mounted valve. Knowledge Indicators 1. Describe the operation of manual overrides. 2. Describe types and sizes of pneumatic conductors and fittings.

Standard 209.6 Connect and adjust flow control and needle valves	2.75	Performance Indicators 1. Adjust pneumatic actuator speed using a flow control valve. 2. Adjust pneumatic actuator speed using a needle valve. 3. Connect flow control valves in meter-in and meter-out circuits. 4. Connect a needle valve to control pneumatic actuator speed. Knowledge Indicators 1. Describe the operation of a needle valve and flow control valve. 2. Describe fluid power speed control circuits (meter-in, out, etc.). 3. Describe the factors that affect pneumatic actuator speed.
Standard 209.7 Monitor performance of pneumatic system pressure and force	2	Performance Indicators 1. Measure ΔP across a pneumatic component. 2. Identify factors that affect pneumatic actuator speed and force. Knowledge Indicators 1. Describe types of resistance in a pneumatic system. 2. Calculate net force output of a cylinder. 3. State Pascal's law and explain its significance in fluid power. 4. Define absolute and gage units of pressure measurement.
Standard 209.8 Monitor pneumatic system operation	2	Performance Indicators 1. Connect and read a rotameter. 2. Connect and read a pneumatic pressure gage. 3. Read an air temperature gage. Knowledge Indicators 1. Describe SI and US Customary pneumatic flow units. 2. Describe the operation of a rotameter. 3. State Pascal's law and explain its significance in pneumatics. 4. Explain the effect of air temperature in pneumatics.
Standard 209.9 Perform basic pneumatic system servicing	2.75	Performance Indicators 1. Drain a pneumatic filter. 2. Inspect and refill an air lubricator. 3. Adjust air lubricator rate. 4. Inspect and replace an air filter element. Knowledge Indicators 1. Describe the operation of an air lubricator. 2. Describe the operation of a pneumatic filter.
	20.25	

Outcomes*	Outcome Title	At the successful completion of this course, students will be able to:
Course Outcome 1	SACA 209.1 AETC041	Standard 209.1 Apply pneumatic system safety procedures
Course Outcome 2	SACA 209.4 AETC041	Standard 209.4 Interpret pneumatic schematics
Course Outcome 3	SACA 209.5 AETC041	Standard 209.5 Connect and operate basic pneumatic circuits
Course Outcome 4	SACA 209.8 AETC041	Standard 209.8 Monitor pneumatic system operation
Course Outcome 5	SACA 209.9 AETC041	Standard 209.9 Perform basic pneumatic system servicing
Primary Laker Learning Competency	Creative Thinking & Problem Solving: Students think creatively to solve problems.	
Secondary Laker Learning Competency	Communication: Students communicate through the exchange of information.	

**Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.*