

GENERAL INFORMATION											
Course Prefix/Number: ETM 1315C	Course Title: Applied Pneumatics and Hydraulics										
Number of Credits: 3											
Degree Type	<input type="checkbox"/> B.A. <input type="checkbox"/> B.S. <input type="checkbox"/> B.A.S <input type="checkbox"/> A.A. <input checked="" type="checkbox"/> A.S. <input type="checkbox"/> A.A.S. <input type="checkbox"/> C.C.C. <input type="checkbox"/> A.T.C. <input type="checkbox"/> V.C.C										
Date Submitted:	Effective Year/Term: 2007-2										
<input checked="" type="checkbox"/> New Course Competency <input type="checkbox"/> Revised Course Competency											
General Education courses must align with the General Education Outcomes. The above course links to the following outcome(s): <table border="0" style="width: 100%;"> <tr> <td><input checked="" type="checkbox"/> Communication</td> <td><input type="checkbox"/> Social Responsibility</td> </tr> <tr> <td><input checked="" type="checkbox"/> Numbers / Data</td> <td><input type="checkbox"/> Ethical Issues</td> </tr> <tr> <td><input checked="" type="checkbox"/> Critical thinking</td> <td><input type="checkbox"/> Computer / Technology Usage</td> </tr> <tr> <td><input checked="" type="checkbox"/> Formulation of strategies</td> <td><input type="checkbox"/> Aesthetic / Creative Activities</td> </tr> <tr> <td><input type="checkbox"/> Cultural / Global Perspective</td> <td><input type="checkbox"/> Environmental Responsibility</td> </tr> </table>		<input checked="" type="checkbox"/> Communication	<input type="checkbox"/> Social Responsibility	<input checked="" type="checkbox"/> Numbers / Data	<input type="checkbox"/> Ethical Issues	<input checked="" type="checkbox"/> Critical thinking	<input type="checkbox"/> Computer / Technology Usage	<input checked="" type="checkbox"/> Formulation of strategies	<input type="checkbox"/> Aesthetic / Creative Activities	<input type="checkbox"/> Cultural / Global Perspective	<input type="checkbox"/> Environmental Responsibility
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Course Description (limit to 50 words or less): This course prepares students to perform mechanical maintenance on industrial equipment and devices. Students learn the theory and application of fluid mechanics, how to calibrate metering devices, and conduct elementary hydraulic tests. Prerequisite or co-requisite: MAC1105. Laboratory fee. A.S. degree credit only. (2 hr lecture; 2 hr lab)											
Prerequisite(s): MAC1105	Co requisite(s): none										

Course Competencies:

Competency 1: The student will demonstrate an understanding of the characteristics of hydraulics and hydraulic systems within the power plant by:

1. Discussing the historical perspective of hydraulics.
2. Explaining the principles of fluid behavior, force, pressure, flow, volume, and capacity.
3. Defining the system characteristics of mechanical, hydraulic, pneumatic, and electrical systems.
4. Discussing the advantages and disadvantages of mechanical, hydraulic, pneumatic, and electrical systems.
5. Explaining the relationship between area, force, and pressure related to hydraulic systems.
6. Performing basic calculations related to area, force, and pressure.
7. Identifying the components of industrial hydraulic systems and explaining the function of each.
8. Discussing the functions of fluid within the hydraulic system.
9. Explaining the compatibility of a fluid to materials used in seals, valves, and other components.
10. Describing the effects of pressure within a hydraulic system.
11. Defining volume, capacity and fluid flow.
12. Performing basic calculations related to volume, capacity, and fluid flow.

Competency 2: The student will demonstrate an understanding of the characteristics of pumps used in hydraulic systems by:

1. Explaining the purpose of a hydraulic pump.
2. Explaining the causes of pressure in a hydraulic system.

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3. Discussing the classification of pumps used in power plants.
4. Explaining the difference between radial and axial motion.
5. Discussing volumetric displacement and volumetric efficiency.
6. Discussing cavitation and ways of preventing it.
7. Describing how external gear pumps work and listing the most commonly used types.
8. Explaining the function of pressure compensation in a hydraulic pump.
9. Performing basic calculations of volumetric efficiency.

Competency 3: The student will demonstrate an understanding of the characteristics of valves and cylinders used in hydraulic systems by:

1. Explaining the functions served by valves in a hydraulic system.
2. Naming the basic ways in which a valve position is changed.
3. Describing the purpose of a flow control valve.
4. Discussing the purpose of a pressure control valve.
5. Listing the advantages and disadvantages of the common types of valves used in hydraulic systems in the power plant.
6. Identifying valve symbols on a schematic drawing.
7. Defining basic terms related to cylinders.
8. Identifying and describing different types of cylinders used in power plant hydraulic systems.
9. Performing basic calculations related to cylinders.
10. Explaining methods for cylinder mounting.
11. Describing methods of speed control.

Competency 4: The student will demonstrate an understanding of the characteristics of accumulators and pressure intensifiers used in hydraulic systems by:

1. Explaining the functions of accumulators.
2. Calculating booster ratios and intensification factors.
3. Listing reasons why a booster might be used to increase pressure in a system,
4. Discussing advantages and disadvantages to using an air pressure regulator instead of a pressure relief valve, in specific situations.
5. Performing calculations related to pressure boosters.
6. Identifying hydraulic symbols approved by the American National Standards Institute for use on fluid power diagrams.
7. Describing how force is transmitted through a hydraulic system.

Competency 5: The student will demonstrate an understanding of the characteristics of pneumatic systems by:

1. Explaining the difference between pneumatics and hydraulics.
2. Describing how pressure is created related to pneumatics.
3. Discussing fluid conditioner devices and their purposes related to pneumatic systems.
4. Identifying the components of a pneumatic system.

Competency 6: The student will demonstrate the ability to perform basic maintenance functions on hydraulic pneumatic systems by:

1. Checking liquid cooling systems to determine that they are functioning within established parameters.
2. Performing hydraulic fluid analysis.
3. Performing visual inspection of motion systems to identify malfunctions.
4. Replacing or cleaning air/fluid filters.
5. Performing electro-mechanical tests on equipment to determine functionality.

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