COURSE OUTLINE

MECH 242 - FLUID POWER LAB

Prepared By: Michael J. Newtown, P.E.
Updated By: Daniel Miller (April 2015)
A. **TITLE**: Fluid Power Lab

B. **COURSE NUMBER**: MECH 242

C. **CREDIT HOURS**: 1

D. **WRITING INTENSIVE COURSE**: No

E. **LENGTH OF COURSE**: 15 weeks

F. **SEMESTER(S) OFFERED**: Fall

G. **HOURS OF LECTURE**: 2 laboratory hours per week

H. **CATALOG DESCRIPTION**:  
A study of force and motion in hydraulic and pneumatic cylinders, involving cylinders, pumps, valves, and accumulators. Electrical, hydraulic, and pneumatic controls will be studied, with an emphasis on sequential operation of fluid devices. Both electrical and fluid schematic diagrams will be examined.

I. **PRE-REQUISITES/CO-REQUISITES**:  
a. Pre-requisite(s): none  
b. Co-requisite(s): MECH 241

J. **STUDENT LEARNING OUTCOMES**:  
By the end of this course, the student will be able to:

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<th>Course Objective</th>
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| 1. Draw and interpret schematic diagrams consistent with industrial practice related to fluid power systems | 1. Communication  
2. Critical Thinking  
3. Professional Competence |
| 2. Apply Pascal and Bernoulli’s laws to investigate the relationships within fluid systems | 2. Critical Thinking |
| 3. Determine horsepower and efficiency for fluid power systems. | 2. Critical Thinking |
| 4. Size pipes, pumps, motors, cylinders, and accumulators. | 2. Critical Thinking |
| 5. Size air compressors to handle the pneumatic systems requirement. | 2. Critical Thinking |
| 6. Interpret sequence diagrams that utilize relay and coil logic. | 1. Communication  
2. Critical Thinking |
| 7. Work in teams to accurately collect data and report results in an industrial accepted format | 1. Communication  
4. Inter-Intrapersonal Skills |
K. **TEXTBOOK:**

L. **REFERENCES:**
   “Fluid Power with Applications” - 5th edition, 
   Industrial Hydraulics Manual, Vickers 
   Closed loop Electro hydraulic Systems Manual, Vickers

M. **EQUIPMENT:** Fluid Laboratory equipment and Computer Drafting room

N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:** Homework, Midterm exam, Final exam, Lab reports

P. **DETAILED COURSE OUTLINE:** See Lab outline

Q. **LABORATORY OUTLINE:**

   I. Pneumatic Circuits
      A. Project 1a - Single Cylinder, Single Cycle  
         Project 1b - Single Cylinder, Automatic  
      B. Project 2a - Dual Cylinder, Automatic, Simultaneous  
         Project 2b - Dual Cylinder, Sequenced, Automatic  
      C. Project 3 - Dual Cylinder, Sequenced, Automatic  
      D. Project 4 - Dual Cylinder, Sequenced, Automatic  
      E. Project 5 - Single Cylinder, Single Cycle, Shuttling

   II. Hydraulic Circuits
      A. Pascal Law project  
      B. Project 1 - Pressure - Force - Area  
         Hydraulic Power  
         Pump Output  
      C. Project 2 - Accumulator Characteristics

   III. Pneumatic Circuits
      A. Project 1 - Pressure Loss  
      B. Project 2 - Venturi Tube

   IV. Fluid Power Circuit Diagram
      A. Symbols  
      B. Reading and Drawing circuits