MET 240 Hydraulics and Pneumatics

Course Description: A course on applied fluid power systems. Topics include: fluid transport, power systems components and circuits, relay logic, and ladder diagrams. Students design, build, and operate hydraulic and pneumatic circuits in the laboratory.

Prerequisites(s): MET 150 **Corequisite(s):** No corequisite

Lecture Hours: 2	Lab Hours: 3	Credit Hours: 3
Lab Fee: 90	Supplemental Fee: 0	Purpose:
☐ Transfer Assurance Guide Course (TAG)	☐ Transfer Module Course (TM)	
Course Format: Lec/Lab	Grading: A/B/C/D/F/I	
Delivery Method: □ Web	□ Hybrid	□ Classroom
Semesters Offered: □ Fall	□ Spring	□ Summer

Course Primary Text:

Title: Fluid Power Technology	Edition: 1st
Author(s): Don F. Norvelle	
Publisher: West Publishing Company	

Supplemental Materials:

Printed handouts from various manufacturers of hydraulic and pneumatic components.
Tables and charts related to hydraulic and pneumatic performance characteristics

Course Outcomes:

1	The student will be able to apply knowledge, techniques, skills and modern tools of the discipline to analyze and solve design problems.
2	The student will have an ability to function effectively as a team member of a technical team
3	The student will have the ability to identify, analyze, and solve narrowly defined engineering technology problems
4	The student has an understanding of the need for, and an ability to engage in self-directed continuing professional development
5	The student will demonstrate a commitment to quality, timeliness, and continuous improvement

Course Topics:

Week 1	An overview of hydraulic and pneumatic systems from a historical prospective. Compare and contrast the attributes of each as related to other methods of power delivery.
Week 2	Basic hydraulic concepts of power, flow, multiplication of force, Pascal's law and Bernoulli's principles.
Week 3	A continuation of the principles of hydraulic and pneumatic properties. An introduction to ISO symbols for cylinders, pumps, compressors and valves.
Week 4	Introduction to Automation Studio (software used for simulation of laboratory activities). Boolean logic and its application in designing a circuit.
Week 5	Directional control valves.
Week 6	Laws governing pneumatics and individual pneumatic components
Week 7	Continuation of the topics from week 6
Week 8	Selection and properties of hydraulic fluids.
Week 9	Hydraulic pumps and motors.
Week 10	Hydraulic cylinders.
Week 11	Pressure control valves and flow control valves.
Week 12	Electrohydraulics and ladder logic including ISO symbols for electronic components.
Week 13	The design of fluid conduits and calculation of system loss.
Week 14	Methods of filtration and design considerations.
Week 15	Additional system components such as: reservoirs heat exchangers, accumulators etc.

Methods of Evaluation/Assessment

□ Formative: □ Summative

List assessment activities (e.g. quizzes, discussions, essays, research papers, debates, oral presentations, exams):

Three exams will be given in the course to assess the student's grasp of the information covered in lecture and in labs.
Students are required to simulate both hydraulic and pneumatic circuits prior to the physical construction of these systems in lab. A grade will be assigned for successfully completing both tasks.
Quizzes will be given to determine the student's grasp of concepts from assigned homework.

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

Course Keeper: David Simmermon

Date Completed: Sept 2013