Revised 08/2022

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
MEC 266 – APPLICATIONS OF FLUID MECHANICS (3 CR.)

Course Description

Teaches theory of hydraulic and pneumatic circuits including motors, controls, actuators, valves, plumbing, accumulators, reservoirs, pumps, compressors, and filters.
Lecture 3 hours per week.

General Course Purpose

This course is designed to teach the students fundamentals of hydraulic and pneumatic systems including their components and design. Students are introduced to different design considerations necessary for repair and modification of hydraulic systems with closed loop control. The course teaches identification and operation of pneumatic components, systems and trouble analysis and introduces basic design for modification and repair and covers open loop control, fluidics, and computer controls.

Course Prerequisites/Corequisites

None

Course Objectives

Upon completing the course, the student will be able to:

- Explain the basic underlying concepts of fluid mechanics.
- Identify the components of a fluid power circuit.
- Outline how the components of a fluid power system are selected and integrated into a successfully working system.
- Explain the operation and requirements of a basic working fluid power system.
- Explain hydraulic circuit operation
- Explain Pascal's Law and calculate force and pressure of a piston and cylinder.
- Construct basic hydraulic and pneumatic circuit schematics.
- Identify pneumatic system components.
- Trace/follow pneumatic circuit design.
- Explain pneumatic circuit operation.
- Demonstrate circuit analysis of common industrial pneumatic systems.
- Troubleshoot open loop control of pneumatic systems.
- Perform analysis of pneumatic control systems.
- Perform mathematical calculations related to hydraulic and pneumatic components and circuits.

Major Topics to be Included

Critical attention will be given to the following topics:

- Principles of hydraulic and pneumatic systems
- Hydraulic system components such as pumps and motors, and valves
- Hydraulic directional control
- Hydraulic pressure control
- Hydraulic flow control
- Pneumatic system components such as compressor, cylinder, actuator
- Fluid power symbols and their functions in the fluid power systems
- Basic principles of pneumatics
- Pneumatic power supply

- Pneumatic components
- Hydraulic/pneumatic schematics
- Programmable control of hydraulic and pneumatic systems