

Course Objectives/Course Outline
Spokane Community College

Course Title: Hydraulic Circuits

Prefix and Course Number: FLPT 251

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Complete exercises
- Explore alternate circuits for equivalent functions
- Differentiate between efficient and inefficient circuits
- Improve poor or existing circuit designs
- Improvise when not all of the circuit information is available
- Interpret various circuits
- Research manufactures information on component specifications and operating limits
- Read and identify circuits by name from a schematic
- Draw circuit schematics from verbal description

Course Outline

- I. Basic Hydraulic Principles
 - A. Energy of Work
 - B. Law of Conservation
 - C. Acceleration
 - D. Flow
 - E. Area, Velocity, and Flow Rate
 - F. Sizing Lines
 - G. Pressure Transmits Force
 - H. Flow through an orifice
 - I. Rotary Motion
 - J. Suction
 - K. Heat in Systems
 - L. Heat of Horsepower
 - M. Dissipating Heat
 - N. Viscosity Index

- II. Pressure Controls
 - A. Overview of Basics
 - B. Manipulating Pressure
 - C. Modulating
 - D. Relief Valves
 - E. Direct Acting
 - F. Differential Piston
 - G. Pilot Operated
 - H. Construction
 - I. Remote Control and Venting
 - J. Reducing Valves
 - K. Heat
 - L. Direct Operated
 - M. Check Valve
 - N. Multi-Function Valves
 - O. Sequence Valve
 - P. Counterbalancing

- Q. Overcenter Valve
- R. Unloading Valve
- S. Hilo Valve
- III. Directional Controls
 - A. Direct Operated
 - B. Pilot Operated
- IV. Flow Controls
 - A. Non-Compensated
 - B. Pressure Compensated
- V. Pumps
 - A. Gear
 - B. Vane, Fixed, and P.C. Comp.
 - C. P.C. Piston
- VI. Cylinders
 - A. Overview
 - B. Sizing
 - C. Levers
 - D. Mounting Styles
 - E. Part Number Ordering
 - F. Materials/Coatings
- VII. Motors
 - A. Horsepower and Torque
 - B. Formula Use
 - C. Torque and Radius
 - D. Speed
 - E. Flow
 - F. Pressure control and Flow Control
- VIII. Hydrostatic
 - A. Internal Components
 - B. Hydrostatic vs. Open Loop
 - C. Flow
 - D. Load Sensing
 - E. Application
 - F. Controls
- IX. Filters
 - A. Contamination
 - B. Particle Size
 - C. Media
 - D. Suction Filtration
 - E. Beta