



MASTER COURSE OUTLINE

Prepared By: Bill Autry

Date: June 2014

COURSE TITLE

Fluid Power Transmission

GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 282

(Formerly:)

CIP Code: 47.0396

Intent Code: 21

Program Code: 768

Credits: 5

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 33

Lab Hrs: 44

Other Hrs:

Distribution Designation:

COURSE DESCRIPTION (as it will appear in the catalog)

The course explores the fundamentals of industrial hydraulic, pneumatic, and vacuum systems. Includes pumps, piping, compressors, check valves, cylinders, motors, control valves and flow controls.

PREREQUISITES

IST 100, IST 102, and MAP 103/117
or Instructor Permission

TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty (Example: *Industrial Fluid Power* by Charles S. Hedges; materials from Womack Machine Supply Company)

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.

- 1) Demonstrate the proper safety techniques while working with fluid drive components
- 2) Application of basic principles of fluid power
- 3) Reading and application of fluid power schematic drawings
- 4) Identify various fluid power components, their applications, and functions
- 5) Troubleshooting common malfunctions
- 6) Use proper testing procedures for the particular fluid power system.

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

- 1) Physical Principles of Fluid Power:
 - a) characteristics of oils
 - b) fluid flow and piping
 - c) compressed air systems
 - d) vacuum application
- 1) Fluid Power Cylinders:

- a) physical properties
 - b) terminology sizing
 - c) speed control
 - d) types
 - e) seals
- 2) Control Valves (2 & 3 way):
- a) spool valves
 - b) hand valves
 - c) flow control valves poppets
 - d) pressure control
 - e) valve application
 - f) direct acting - pilot operated
- 3) Control Valves (2 & 3 way contd.):
- a) thermal relief valve
 - b) cushion relief valves
 - c) check valves
 - d) quick exhaust valves
 - e) shuttle valves
- 4) Control Valves (4 way & 5 way):
- a) Directional control of cylinders
 - b) schematic diagrams
 - c) button bleed valves
 - d) spool valve
 - e) automatic retraction
 - f) continuous reciprocation of cylinders
- 5) Hydraulic Pumps & Air Compressors:
- a) air compressor types
 - b) gear pumps
 - c) rotary vane pumps
 - d) pressure compensator
 - e) piston pumps
 - f) non positive displacement pumps
 - g) unloading hydraulic pumps
 - h) input horse power
 - i) cavitation
 - j) pump operation
- 6) Other Fluid power Components:
- a) air pressure regulator
 - b) air line lubricators
 - c) air filters and dryers
 - d) oil reservoirs
 - e) accumulators
 - f) heat exchange
- 7) Troubleshooting:
- a) hydraulic
 - b) symptoms

- c) procedures
- d) Pneumatics

DEPARTMENTAL GUIDELINES *(optional)*

DIVISION CHAIR APPROVAL

DATE