ITT Technical Institute

AM355
Pneumatics and Hydraulics

Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 50 (30 Theory Hours, 20 Lab Hours)

Prerequisite(s) and/or Corequisite(s):
College algebra and trigonometry, A college level Physics course

Course Description:
The principles, functions, terminology and uses of fluid power components are studied in this course. Control techniques are examined by interpreting hydraulic and pneumatic drawings and symbols. The course offers the opportunity to study actuation and fluid power transmission devices, as well as the properties of fluids, including causes and consequences of fluid contamination.

Outside Work:

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a "time-based option" for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the "Course Outline" section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

 Date: 3/22/2007

STUDENT SYLLABUS

Instructor: _____

Office hours: _____

Class hours: _____

Major Instructional Areas

- Introduction to Fluid Power
- Physical Properties of Hydraulic Fluids
- Energy and Power in Hydraulic Systems
- Frictional Losses in Hydraulic Pipelines
- Hydraulic Pumps
- Hydraulic Cylinders and Cushioning Devices
- Hydraulic Motors
- Hydraulic Valves
- Hydraulic Circuit Design
- Hydraulic Conductors and Fittings
- Ancillary Hydraulic Devices
- Pneumatics: Air Preparation and Components
- Pneumatics: Circuits and Applications

Course Objectives

Upon successful completion of this course, students should be able to:

1. Define pneumatics and hydraulics.
2. Identify applications of hydraulics and pneumatics.
3. Classify fluids and their application systems.
4. List extrinsic and intrinsic properties of fluids.
5. State the units of measurement and units of conversion to measure properties of fluids.
6. Identify forces acting on a fluid.
7. State, derive, and apply Pascal's law.
8. Define hydrostatic transmission and identify application areas of hydrostatic transmissions.
9. Measure pressure with devices, such as Piezometers, pressure gauges, and transducers.
10. Explain behavior of gases using perfect gas laws.
11. Define and classify types of processes.
12. List the properties of the atmosphere and explain the variation of pressure, temperature, and density in the atmosphere.
13. List kinematics' properties of fluids.
14. Classify types of flows and flow lines in flowing fluids.
15. State and apply non-dimensional numbers, such as the Reynolds numbers.
16. Draw and apply Moody diagrams.
17. Apply the equation of conservation of mass, energy, and momentum to real-life areas.
18. State, derive, and apply Bernoulli's equation.
19. Apply, design, and maintain flow and pressure measurement systems.
20. Design and analyze pneumatic and hydraulics systems.
21. Identify performance and efficiency factors in pneumatic and hydraulic systems.
22. Identify some common problems in systems and devise preventive mechanisms.
23. Troubleshoot pneumatic and hydraulic systems.

Student Textbook and Materials

- Fluid Power with Applications, Prentice Hall, 6th edition, 0130608998

Course Outline

Unit	Topic (Lecture Period)	Chapters	Lab and Other Coverage
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1	Introduction to Fluid Power Physical Properties of Hydraulic Fluids	1 2	Lab, Homework Exercises
2	Energy and Power in Hydraulic Systems	3	Lab, Homework Exercises
3	Frictional Losses in Hydraulic Pipelines	4	Lab, Homework Exercises
4	Hydraulic Pumps and Hydraulic Symbols	5 Appendix G	Lab, Homework Exercises
5	Hydraulic Cylinders and Cushioning Devices Hydraulic Motors	6 7	Lab, Homework Exercises
6	Hydraulic Valves	8	Lab, Homework Exercises
7	Hydraulic Circuit Design	9	Lab, Homework Exercises
8	Hydraulic Conductors and Fittings Ancillary Hydraulic Devices	10 11	Lab, Homework Exercises
9	Pneumatics: Air Preparation and Components	13	Lab, Homework Exercises
10	Pneumatics: Circuits and Applications	14	Lab, Homework Exercises
11	Review and Final Examination	The final examination will be based on the content covered in chapters 1 - 11, 13, 14.	

Evaluation Criteria and Grade Weights

- Quizzes 10%

- Homework 20%
- Exams 20%
- Lab exercises 20%
- Final exam 30%

Final grades will be calculated from the percentages earned in class as follows:

A	90 - 100%	4.0
B+	85 - 89%	3.5
B	80 - 84%	3.0
C+	75 - 79%	2.5
C	70 - 74%	2.0
D+	65 - 69%	1.5
D	60 - 64%	1.0
F	<60%	0.0

