IND112 Fluid Power I Syllabus

Course Information

Credits 3
Campus Washburn Institute of Technology (Forbes Facility)
Address 6530 SE Forbes Avenue
City/State/Zip Topeka, Kansas 66619
Office Fax 785-670-2734

Description
This course provides fundamentals of pneumatics, air compressors, control valves, pneumatic cylinders, electropneumatic controls; and basic pump principles, working of centrifugal pumps, magnetic drive pumps, diaphragm pumps, metering pumps and pump seals. Students learn how to operate, install, troubleshoot, analyze performance, and design basic pneumatic systems and pump systems.

Textbooks
ISBN: 978-0-826-93705-6

Student Learning Outcomes:
A. Communicate effectively
B. Integrate technology
C. Learn effectively
D. Demonstrate cooperative teamwork skills
E. Apply safety in the workplace
F. Think critically and creatively
G. Demonstrate responsible work ethics

Competencies
1. Summarize the safety hazards and conditions when working with pneumatic systems.
2. Recommend wearing the proper eye protection while working around pneumatic systems.
3. Verify bleed off, shutoff valves and specialty tools needed to work on pneumatic systems.
4. Explain the physical characteristics of gases with fluid while incorporating the properties of absolute, gauge and vacuum pressure.
5. Explain the components of a pneumatic system such as: compressor controls, gauges, inter and after-cooler, receivers, refrigerant dryers, separators, FRL units, drains and their purposes within the pneumatic system.
6. Develop an understanding of a proper air distribution system.
7. Describe the function of a pneumatic motor and give applications.
8. Describe the function of a pneumatic quick connect fitting and a single and double acting...
pneumatic cylinder giving applications and schematic symbols.

9. Pneumatic Schematic Symbols- describe and identify line symbols used with pneumatic circuits observing the seven basic rules for drawing pneumatic schematics.

10. Describe the function of 2-way, 3-way, 4-way, and 5-way valves while selecting the position and centering portage.

11. Explain the function and usage of quick exhaust valves, needle valves and pressure regulators and where located in the circuit by the use of schematic symbols.

12. Describe the main operation of a meter-in and meter-out flow control circuit during speed control using examples of application and draw schematic symbols used for blueprints.

13. Describe types and operating characteristics of pumps used in industrial applications.

14. Describe the relationship between pressure and head, determine the required pump head, and convert between pressure and head.

15. Determine suction, discharge, and total head using vacuum and pressure gauges.

16. Select, maintain, inspect, troubleshoot, and repair these pumps: centrifugal pumps, magnetic drive pumps, diaphragm pumps, gear pumps, and metering pumps.

17. Demonstrate installation, start up and operation of these pumps: centrifugal pumps, magnetic drive pumps, diaphragm pumps, gear pumps, metering pumps.

18. Measure and adjust the flow rate of these pumps: centrifugal pumps, magnetic drive pumps, diaphragm pumps, gear pumps, metering pumps.

19. Assemble and operate a series pump system.

20. Measure series centrifugal pump system flow and pressure and calculate the efficiency of the system.

21. Assemble and operate a parallel pump system.

22. Measure parallel pump system pressure and flow and calculate the efficiency of the system.

23. Describe and identify the construction, operation, and components of these pumps: centrifugal pumps, magnetic drive pumps, diaphragm pumps, gear pumps, metering pumps.

24. Disassemble, inspect, and repair these pumps: centrifugal pumps, magnetic drive pumps, diaphragm pumps, gear pumps, metering pumps.

**Guidelines for Success**

**Assessment Plan**
Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution’s technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

**Grading Rationale**
Class sessions and assignments will include daily homework, in-class review of homework, quizzes. Grades will be based on: Attendance and general participation, daily homework, quizzes and tests and final exam.

**Grading Scale**

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<tr>
<th>Percentage</th>
<th>Grade</th>
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<tr>
<td>90% or higher</td>
<td>A</td>
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<tr>
<td>80% to 89%</td>
<td>B</td>
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<tr>
<td>70% to 79%</td>
<td>C</td>
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<tr>
<td>60% to 69%</td>
<td>D</td>
</tr>
<tr>
<td>Less than 60%</td>
<td>F</td>
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Attendance
Tardies and absences will affect the daily grade for attendance. Students who miss class should inform the instructor beforehand whenever possible, and are responsible for course content, for turning in any required homework, and for taking the initiative to make up any missed tests, labs or quizzes.

Disability
The Special Support Services (SSS) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities MUST register and provide documentation with the office to be eligible for services. New requests for accommodations should be submitted two months or more prior to the date services should begin; however, contact the SSS Office as soon as a need may arise. Depending on the accommodation request, four to eight week lead time may be needed for timely and effective provision of services. SSS coordinates and assist in arranging services it deems appropriate of eligible students on a case-by-case basis.

If you are a student with a disability that may substantially limit your ability to participate in this class and believe you will need accommodations, it is your responsibility to contact:

Special Support Services Coordinator
Phone: 785-228-6356
E-Mail: ssscoordinator@washburn.edu