IND148 Mechanical Systems II 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 understanding of mechanical energy transmission concepts along with lab experience to operate, install, analyze performance, and design mechanical drive systems using right angle gears, bearings and couplings. Students learn how to setup and operate laser shaft alignment and apply vibration analysis to various power transmission systems. Prerequisite/Corequisite: IND108 or consent of instructor.

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. Identify various types of plain bearings and their applications, installation, and maintenance.  
2. Demonstrate how to install, maintain, and specify plain and anti-friction bearings.  
3. Demonstrate selection, maintenance, and troubleshooting of a variety of couplings.  
4. Identify the universal code used to specify ball bearings.  
5. Demonstrate the installation of ball bearings using an arbor press and a bearing heater.  
6. Calculate gear ratio, shaft speed, and torque of a gear drive system.  
7. Select and identify gears for a given application.  
8. Explain the proper lubrication system and point out troubleshooting steps for a gear drive system.
system.
9. Identify types of heat exchangers.
10. Explain the purpose and application of heat exchangers.
11. Explain the characteristics of steam traps and safety valves.
12. Demonstrate the proper procedures for sharpening a twist drill.
13. Explain laser shaft alignment principles and operation.
15. Demonstrate horizontal parallel and horizontal angular alignment.
16. Explain vibration concepts, resonant frequency and sympathetic vibration.
17. Demonstrate velocity, acceleration and spike energy measurement with vibration meter.
18. Demonstrate vibration compensation through isolation, dampening and vibration reduction.

**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**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<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