Course: Measurements and Transducers Laboratory 0908452 (1 Cr. – Core Laboratory)

Instructor: Eng. Nadeen Habash

Course Website: [http://elearning.ju.edu.jo](http://elearning.ju.edu.jo)

Catalog Data: Sensors (LVDT, LDR, phototransistors, Thermocouple, piezo-electric, thermistor, RTD, Strain gauge, op-amps) characteristics (Linearity, Hysteresis, sensitivity, range), signal conditioning circuits. Signal processing using PC and Labview software.

Prerequisites by Course: Transducers and Sensors (980451) or Concurrently

Prerequisites By Topic: The student should have the basic knowledge of sensors types and characteristics and how to design signal conditioning circuits.

Textbook:

Schedule & Duration: 16 Weeks, 10 lab sessions (3 hours each) plus exams.

Minimum Student Material: Lab notes, class handouts, instructor lab discussion, calculator and an access to a personal computer

Instructional Methods:
1. Conducting experiments
2. Use LabView to read measured signals
3. Writing lab reports

Minimum College Facilities: Lab room with whiteboard and laboratory instrumentation.

Course Objectives: The objective of this laboratory is to introduce students to the different types of sensors and transducers and their readout circuits. Also, to teach them the principles of measurement and instrumentations.

Course Learning Outcomes and Relation to ABET Student Outcomes:
Upon successful completion of this course, a student should:
1. Learn the basics of electrical laboratory instrumentation, including multi-meters, power supplies, function generators, and oscilloscopes. (b)
2. Conduct experiment and analyze and interpret the results. (b,g)
3. Learn sensors and transducers types and understand their characteristics. (b)
4. Build suitable signal conditioning circuit for various transducers. (b, g)
5. Use NI LabView software and DAQ to display, record, and analyze results. (b)
6. Write complete technical reports. (b, g)

Mapping to Student Outcomes

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<tbody>
<tr>
<td>Percentage of Course total marks</td>
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Course Topics:

Exp. | Measurement and Transducers Lab: | Hrs
---|---|---
1. | Measurement errors | 3
2. | Measuring resistance using voltmeter ammeter method | 3
3. | Linear Variable Differential Transformer (LVDT) | 3
4. | Strain guage | 3
5. | Thermocouple | 3
6. | Thermistor | 3
7. | Light Dependent Resistor (LDR), Signal processing using labview | 3
8. | Filtering | 3
9. | RTD | 3
10. | Capacitive transducer | 3

Ground Rules:

Attendance:
Students are expected to attend EVERY LAB SESSION and they are responsible for all material, announcements, schedule changes, etc., discussed in class. The university policy regarding the attendance will be strictly adhered to.

Assessments:
Exams, Quizzes and discussion.

Grading policy:

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<tr>
<td>Lab. reports</td>
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<td>Quizzes, discussion and class work</td>
<td>15%</td>
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<td>Midterm exam</td>
<td>25%</td>
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<td>Final exam</td>
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Last Updated: Feb. 2018