



JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
MECHANICAL ENGINEERING DEPARTMENT
ME 472 Measurements and Dynamics Lab
Semester

Catalog Data- 2013 : 1 Credit hour (3 h lab) Analysis of experimental data. Basic electrical measurement and sensing devices. Pressure, temperature, force, and strain measurements. In addition to dynamic measurements.

Text Book(s): Measurements and Dynamics lab manual (e-learning)

References: James W. Dally, 1993 "Instrumentation for Engineering Measurements", Second Edition. And any dynamics book

Instructors: _____

Lab Schedule: _____

Office Hours: _____

Objectives:

- 1- Statistical analysis of experimental data (b)
- 2- Be able to perform instrument calibration and relate theoretical principles to real engines. (b)
- 3- Evaluate and design performance of different measurement systems. (c)
- 4- get familiar with operational amplifier and its different types and applications in addition to different electrical components such as power supply, recorders..(c)
- 5- Students will work on groups in a project related to the lab, in this project students are asked to write small report about new trends in sensors, how it works and its applications.(h, i, j)

Topics Covered:

- ◆ **Week 1 :- Calibration.**
- ◆ **Week 2 :- System response Characteristics (FOS & SOS).**
- ◆ **Week 3 :- Resistance Type Transducer (Deflection Bridge).**
- ◆ **Week 4 :- Operational Amplifier (Inverting & No-Inverting).**
- ◆ **Week 5 :- Operational Amplifier (Integrator, Differentiator & Voltage Follower.**
- ◆ **Week 6 :- Strain gage (modulus of elasticity, Stress Concentration)**
- ◆ **Week 7 :- Strain gage (Principal stress & strain , Poisson`s ratio).**
- ◆ **Week 8 :- Temperature Measurements (Thermocouple).**
- ◆ **Week 9 :- Mid Exam**

Vibration Experiments

- ◆ **Week 10 :- Basic Dynamic Measurements .**
- ◆ **Week 11 :- Lateral Vibration of Beams.**
- ◆ **Week 12 :- Free Torsional Oscillation with Damping.**
- ◆ **Week 13 :- Static & Dynamic Balancing .**

Computer Usage: Microsoft Excel, word, students can use Matlab .

Design Activities/Project(s): The students will do the experiments listed above. In addition they will be introduced to different devices that they can be used in measurement and signal processing systems. Such as the Elvis.

Lab. Experiment(s): The students will do the experiments listed above.

Scientific Visit(s): The students are encouraged to visit strength of material lab, Mechatronics lab in addition to what they do in this lab, to see type of measurements available in our labs.

Evaluation:

Reports and lab work	35%
Midterm	25%
Final Exam	40%

Relationship of the Course to ME Outcomes:

ABET a – k	√	Mechanical eng. Program Outcomes
a		a. Apply knowledge of mathematics, science, and engineering in practice.
b	H	b. Design and conduct experiments as well as analyze and interpret data.
c	M	c. Design a system, components, or process to meet desired needs.
d		d. Function on multidisciplinary teams.
e		e. Identify, formulate, and solve engineering problems.
f		f. Understanding of professional and ethical responsibility of an engineer.
g		g. Communicate effectively.
h	M	h. Broad education to understand the impact of engineering solutions in global and societal context.
i	M	i. Recognition of the need for, and possess the ability to engage in, lifelong learning.
j	M	j. Possess knowledge of contemporary issues.
k		k. Use the techniques, skills, and modern engineering tools necessary for engineering practice.
		l. Adhere to safety rules and regulations.

ABET Category:

Engineering Science	1	Credits
Engineering Design	0	Credits

Prepared By: _____

Date: _____