

WICHITA STATE UNIVERSITY
Mechanical Engineering Department
ME 403: Measurements and Instrumentation
&
Mechanical Engineering LAB

Prerequisites: ME 339, ECE 282 and Math 555.

Description: An introduction to the terminology and analysis of the experimental techniques specific to various areas of mechanical engineering measurements.

Textbook:

Experimental Methods for Engineering, J.P. Holman, 7th Ed., McGraw-Hill (2000)

Reference:

Introduction to Engineering Experimentation, Anthony J. Wheeler and Ahmad R. Ganji.
Guide to Writing as an Engineer, David Beer. John Wiley and sons (1997).

Coordinator/ Instructor:

Majid Feiz, Room 101B, e-mail: mxfeiz@alpha.engr.twsu.edu; Office Hours: Monday and Wednesday 10 to 12 am.

Lectures:

5:35-6:20 M, W

Course Objectives: The objective of this course is to introduce student to basics of obtaining engineering measurements. Necessary theory will be discussed, followed by many application in areas such as strain, temperature and pressure. Apart from the above said goals the students expected to learn the following:

- 1- Ability to relate the theory with the relevant experimental set up.
- 2- Interpret the results and relate to the relevant laws.

Tentative lecture topics:

- 1) Basic Concepts (Definition of important terms common to all Measurements System, Dynamic response in Zero-First and Second Order System).
- 2) Analysis of Experimental Data.
- 3) Basic Electrical Measurement and Sensing Devices.
- 4) Pressure Measurement.
- 5) Flow Measurement.
- 6) Force and Strain Measurement.
- 7) Motion and Vibration.
- 8) Temperature Measurement.
- 9) Data Acquisition

Homework:

Homework helps students to understand and apply fundamentals in solving engineering problems.

Operation:

- 1- Problems will be chosen by the instructor and assigned in the class.
- 2- The assigned problems should be attempted by the students before the beginning of the following lecture. Any difficulties can be discussed with the instructor before or in the following lecture period.
- 3- No late homework can be accepted for grading.
- 4- No make-up exams will be given without prior consent of the instructor except for very unusual circumstances.

Mechanical Engineering LAB

The students are scheduled to do the following experiment in the LAB:

- LAB- 1 Static Pressure Measurements and Correlation.
- LAB- 2 First Order System Response
- LAB- 3 Flow around a blunt body.
- Lab -4 Temperature and Heat Balance Measurements
- Lab -5 Wheatstone Bridge
- Lab -6 Strain Measurement

Course Grading:

Homework and lab work	40%
Midterm	30%
Final Comprehensive Exam	30%