ME 241 – Experimental Methods

Hour: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.
Coordinator: Salem Haggag

Text Book:

- Experimental Methods for engineers Text/Handout.

Reference Books:

- J.P. Holman, Experimental Methods for Engineers, McGrawHill, 1984, 5th Edition
- Figliola, R. S., Beasley, D.E. (2006) "Theory and Design for Mechanical Measurements" 4th ed., John Wiley & Sons, Inc., Hoboken, NJ. ISBN: 0-471-44593-2.
- Taylor, J. R. (1997), "An Introduction to Error Analysis", University Science Books, 2nd edition.

Specific course information

a. Introduction to experimental methods, sensors, and computer-aided data acquisition with emphasis on mechanical applications. Survey of transducers and measurement methods for a broad range of phenomena significant for mechanical engineers. Particular emphasis will be given to data retrieval, oral and written communication of experimental results. Laboratories experiments will give students hands-on
b. Prerequisite: None
c. Designation: Required

Specific goals for the course:

- Ability to design and conduct experiments, collect, analyze and interpret data.
- An ability to function on multi-disciplinary teams
- An ability to use the techniques, skills, and modern engineering tools necessary for Mechanical engineering practice

Course instruction outcomes:

- The students will be able To understand modern engineering experimentation including experiment design, system calibration, data acquisition, analysis and presentation.
- The students will be able To understand how to quantify error and uncertainty in physical measurements.
- The students will be able To gain hands-on experience with modern instrumentation and systems-level experimentation.

- The students will be able To improve written and oral communication skills, to develop the ability to write engineering reports of high quality, and to improve the student's ability to function as a member of an engineering team.

Student outcomes:
B, D, K

Topics Covered:
- Generalized Measuring System, Significant Digits, Rounding, Truncation
- Data Acquisition, Signals, Signal Conditioning, Sampling
- Lab View – Lab View Tutorial
- Back ground and Introduction to thermal experiments
- Background and Introduction Fluid mechanics experiments
- Background and introduction to Material experiments
- Background and Introduction to solid mechanics experiments
- Presentation & communication skills
- Accuracy, Precision, Error in Measurement, Calibration - Lab Work
- Uncertainty Analysis
- Displacement and Dimensional Measurement – Lab work
- Library Exercise

Course / credit hours	Math & Basic Sciences	Engineering Topics	General Education
Experimental Methods (ME241)/3		3	