



## Advanced Engineering Measurements 944703

**Course Instructor:**

**Prepared by:**  
**Date of Outline Preparation:**  
**Date of Last Revision:**

### Text Book

**Doebelin, E. O., Measurement Systems: Application and Design. 5<sup>th</sup> Ed. McGraw Hill.**

### References:

1. Holman, J. P., Experimental Methods for Engineers. 7<sup>th</sup> Ed. McGraw-Hill.
2. Beckwith, Buck, and Marangoni, Mechanical Measurements. 3<sup>rd</sup> Ed. Addison Wesley.
3. Figliola and Beasley, Theory and Design for Mechanical Measurements. 2<sup>nd</sup> Ed. Wiley.
4. Bruun, H. H., Hot-Wire Anemometry: Principles and Signal Analysis. Oxford University Press, U.K.
5. Durst, F., Melling, A., and Whitelaw, J. H., Principles and Practice of Laser-Doppler Anemometry. Academic Press, London.
6. Cheremisinoff, N. P. and Cheremisinoff P. N., Flow Measurement for Engineers and Scientists., Marcel Dekker, New York.
7. Jain, Er. R. K., Mechanical and Industrial Measurements. 8<sup>th</sup> Ed. Khanna Publishers, Delhi.
8. Dally, J. W., Riley, W. F., and McConnell, K. G., Instrumentation for Engineering Measurements. Wiley.

### Course Contents

1. Introduction to Experimentation and Measurement Systems.
2. General Concepts in Instrumentation and Measurements.
3. Static and Dynamic Characteristics of Mechanical Systems.
4. System Response and Signal Analysis.
5. Modelling of Heat and Fluid Flow Systems.
6. Flow Pattern Visualization.
7. Fundamentals of Hot-Wire Anemometry.
8. Laser-Doppler Anemometry.
9. Measurement of Force, Torque, Motion, Vibration and Noise.
10. Miscellaneous Measurements: Time, Frequency, Fiber-Optic Sensors.
11. Strain and Stress analysis, Strain gages and Load Cells, Photoelasticity.

## Assignments

It is essential to your progress and to your mastery of the subject matter that the text assignments to be read and all the assigned problems to be worked. Portions of the reading assignments are closely related to the lectures, and either gives an advance view or a review of the subject matter of the lectures. Other portions, equally important, provide related material, examples and expanded accounts of topics for which there is insufficient time in the lectures. You are responsible for the subject matter of the reading assignments and problems, in addition to the subject matter of the lectures.

The term paper project includes in addition to a report, a presentation related to the course.

## Assessment

There will be on the basis of demonstrated knowledge, based roughly 30% on the mid-term exam, 30% on the term paper, homework, class activities and recitation, and 40% on the final exam.

## Attendance

Attendance of classes is obligatory. Absence must be verified according to the university's regulation.