

The Science of Measurements

(Metrology Concepts)

Metrology is an essential aspect of instrumentation and measurements systems. This course introduces the fundamentals of metrology to include sensors, signal conditioning, data acquisition, display and analysis. Critical issues such as noise reduction, error propagation, measurement reproducibility and calibration are studied. Instrumentation for electrical and mechanical measurements are included along with their corresponding measurement standards. These concepts of metrology are described from the macro to nano scale. The laboratory portion of this course uses facilities throughout campus including the Polytechnic laboratories, Birck Nanotechnology Center, Zucrow Labs and various industrial locations.



Course Objectives: After completing this course the student should be able to:

1. Classify instrumentation necessary to make measurements of interest and explain the importance of calibration.
2. Summarize the standards of typical measurements.
3. Implement various methods of reducing system and environmental noise.
4. Demonstrate methods of data acquisition and analysis methods.
5. Calculate errors budgets and adjust instrumentation to meet error budgets.

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