

ME401 Syllabus

Instructor: Alan Weston

Office: EGRB110

- I. **Department, Number, and Title of Course:** Mechanical Engineering and Energy Processes, ME 401 (1), Thermal Measurements Laboratory
- II. **Course (catalog) Description:** Study of basic measurements used in the thermal sciences. Calibration techniques for temperature and pressure sensors. Thermal measurements under transient and steady-state conditions. Applications include conduction, convection and radiation experiments, uncertainty analysis, handling and reduction of data.
- III. **Prerequisite(s):** ME 302
- IV. **Textbook(s) and/or Other Required Material:** Lectures and writing resources provided online.
- V. **Course Objectives:** Basic measurements used in the thermal sciences will be studied in this course. Thermal measurements under transient and steady-state conditions will be performed. Applications include conduction, convection, radiation, psychrometrics, fluid dynamics, and refrigeration experiments. Uncertainty analysis, data acquisition and processing will also be covered.
- VI. **Topics Covered:**
 - Making & Calibration of Thermocouples
 - Thermal Conductivity
 - Counter-Flow Heat Exchanger
 - Transient Heat Conduction
 - Radiation Heat Transfer
 - Refrigeration
 - Cooling Tower
- VII. **Class/laboratory Schedule, i.e., number of sessions each week and duration of each session:** Meets at least twelve times during the semester for lectures lasting up to 1.5 hours and relevant to upcoming lab experiments. Lab sessions meet seven or more times during the course of the semester to conduct experiments.
- VIII. **Contribution of Homework, Quizzes, Tests, Laboratory Reports, or Research Papers:** Lab reports 80%, lab final 20%
- IX. **Contribution of Course to Meeting the Professional Component:** The course focuses on conducting experimental laboratories by starting the experiment, collecting necessary data, and shutting down the experiment. Also the course teaches correct analysis of the collected data and determination of the accuracy of results. Advanced software applications are learned during this

part of the course. The course also emphasizes technical writing and proper display of data/results in tables and graphs. Engineering Science: 1 credit (100%), Engineering Design 0 credits (0%)

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