

Mechanical Engineering and Mechanics

MEM 311 Thermal and Fluid Science Laboratory

Fall 2006/Spring 2007

Designation: Required

Catalog Description: Introduces modern laboratory techniques, including statistical analysis of experimental data; thermodynamic properties and equations of state; and dynamic and static temperature measurements with potentiometers, bridge circuits, and oscilloscopes.

Prerequisites: MEM 220 Minimum Grade: D and MEM 310 Minimum Grade: D

Textbook(s) and other required material:

Required: Thermal and Fluid Sciences Laboratory Manual, Rev 01
Web Page: <http://files.irt.drexel.edu/courseweb/mem311-00/>

Course Objectives:

1. Perform four (4) experiments that relate to thermal and fluid science. Produce formal reports for each of these experiments.
2. Select a single experiment and produce a detailed presentation.
3. Learn how to apply data analysis and least squares analysis to data accumulated during experimentation.
4. Explore laboratory instrumentation used in thermal and fluid science

Topics:

1. Experimentation and report requirements
2. Uncertainty analysis
3. Least squares analysis
4. Reasons for experimentation
5. Review modern tools and instrumentation
6. Final presentation

Class Schedule: 3 hours/alternate week Laboratory; lecture/week (2 credits).

Contribution to Professional Component:

Contributes toward the 1 ½ year of engineering topics appropriate to developing the ability to work in the thermal systems area.

Relationship to Program Outcomes:

Outcomes a - k	Content	Explanation	Evidence
a. An ability to apply knowledge of mathematics, science and engineering	2	This course requires the students to apply their general understanding to problems in thermal and fluid science	Experiments and presentation
b. An ability to design and conduct experiments as well as to analyze and interpret data	1	This course requires students to conduct thermal and fluid science experiments and to analyze and interpret the data they accumulate	Reports for each experiment and formal presentation
c. An ability to design a system, component or process to meet desired needs	0	NA	NA
d. An ability to function on multidisciplinary teams	2	The students form teams and work together to produce reports	Reports for each experiment and formal presentation
e. An ability to identify, formulate and solve engineering problems	2	The experiments require students to identify, formulate and solve engineering problems.	Reports for each experiment and formal presentation
f. An understanding of professional and ethical responsibility	1	This is emphasized as part of the engineer's overall responsibility.	Reports for each experiment formal presentation
g. An ability to communicate effectively	2	Written presentation of experimental results is required.	Reports for each experiment and formal presentation
h. The broad education necessary to understand the impact of engineering solutions in a global/societal context	0	NA	NA
i. A recognition of the need for and an ability to engage in lifelong learning	0	NA	NA
j. A knowledge of contemporary issues	0	NA	NA
k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice	2	Experiments use modern equipment and appropriate programs such as LabView	Reports for each experiment and formal presentation

Prepared by:

Dr. William J Danley, November 21, 2006