MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 346 Thermal Science Laboratory (1) Required

Course Description: (2013-15 Catalog) Heat transfer and thermodynamic experiments covering combined free convection and radiation, transient conduction, energy conversion, heat exchanger, polytropic blowdown, steam turbine, and refrigeration cycles.
1 laboratory.

Prerequisite Courses: ME 303, ME 343

Prerequisites by Topic: Thermal Engineering
Fluid Mechanics
Heat Transfer

Textbook:(and/or other required material) ME 346 Thermal Sciences Laboratory, El Corral, 2013.

References: None

Course Coordinator/Instructor: James LoCascio
Associate Professor of Mechanical Engineering

Course Learning Outcomes:

1. Perform thermal/fluid experiments.
2. Collect experimental data.
3. Reduce data and compare to theoretical model.
4. Interpret the results as related to physical observations
5. Summarize the results in a report.

Relationship of Course to MECHANICAL ENGINEERING Program Outcomes:												
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*
H	**H**			**H**		**H**				**H**	**H**	**H**

Topics Covered:

1. This laboratory course acts as a capstone for Thermal Engineering (ME 303) and Heat Transfer (ME 343). It provides an opportunity for the student to reinforce, integrate, and rediscover material that was covered in these courses.

2. Engineering processes involving thermodynamics, fluid mechanics, and heat transfer are investigated through the following experiments:

   - Polytropic Expansion
   - Measuring Thermal Properties
   - Potential to Internal Energy Conversion
   - Vapor-Compression Refrigeration Cycle
   - Air/Water Co-current Flow Heat Exchanger

3. The laboratory experiments are designed to give the student hands-on experience with engineering instrumentation, including analog and digital data collection. The experimental data is then reduced and compared to the results of an analytical or numerical model. The laboratory is then documented in either a technical memo or report.

The course has been organized to present the relationships between experimental, analytical, and numerical methods applied to thermodynamics and heat transfer problems with the motivation coming from the experiments.

Laboratory Projects: There are no projects, just technical memos or reports used to document the experiments noted in "Topics" above.

Class/Lab Schedule: One 170-minute lab per week.

Contribution of Course to Meeting the Professional Component:

(a) College-level mathematics and basic sciences:	0 credit
(b) Engineering Topics:	1 credit
Design?	no
(c) General Education:	0 credit
(d) Other:	0 credit

Prepared by: Kim Shollenberger **Date:** 6/01/2014