

## MAE 188 ENGINEERING DESIGN IN INDUSTRY

(Elective for ME)

**Catalog Data:** **MAE 188: Engineering Design in Industry (Credit Units: 4) F, W, S.** Presents the principles of engineering design in the context of an industrial application. Local manufacturing firms define an engineering design project to be completed by students in 10 weeks. Projects include initial brainstorming to final design, with a formal presentation of the result. (Design units: 4)

**Textbook:**

**References:** Eppinger, S. and Ulrich, K. *Product Design and Development*

**Coordinator:** Derek Dunn-Rankin

**Course Outcomes:** Students will:  
Design a system, component, or process to meet desired needs.  
Function on a multi-disciplinary team.  
Identify, formulate, and solve engineering problems particularly to conceptualize objectives and constraints.  
Identify governing principles,  
Apply fundamental analytical tools, and predict performance.  
Communicate effectively.

**Prerequisites By Topic:**

**Lecture Topics:** Project definition. Identify the goal. Accumulate and define the requirements.  
Define specifications. Refine project concept after iteration with companies and faculty. Develop rough solution possibilities.  
Background Information gathering.  
Proposed Solution and Test/Analysis Needs. Design/Prototype. Series of tests and measurements. Refined project definition.  
Preliminary design review at company site. Presentation discussion with company about the direction for the future. Refine project definition.  
Follow through design review recommendations.  
Final exam presentation.

**Class Schedule:** Meets for 3 hours of lecture and 1 hour of discussion each week for 10 weeks.

**Computer Usage:** Depends on each group's project.

**Laboratory Projects:**

**Professional Component:** Contributes toward the Engineering Topics and/or Design experience for both Mechanical and Aerospace Engineering majors. Students are engaged in a major design experience coordinated with local industry for the entire quarter.

**Relationship to Program Outcomes:** This course relates to Program Outcomes a, b, c, d, e, f, g, h, i, j, k, and l; with additional Mechanical Engineering outcomes 1 and 4 as stated at:

<http://undergraduate.eng.uci.edu/degreeprograms/mechanical/mission>

This one-quarter multi-disciplinary team design effort achieves a project goal posed by an industry sponsor. It is a realistic design problem and represents a professional exercise in contemporary design. Because the problem is posed by industry, the task is open-ended and not defined as a textbook challenge. This means that experiments must be developed, analytical and computational tools exercised, data collected and interpreted, benchmark studies undertaken, constraints identified and engineering problems posed and solved. In addition, a midterm design review and final design presentation require communication skills. The interaction between industry and the university bring issues of professional and ethical responsibilities into focus and demonstrate a relation between engineering and the larger society. Interacting with professional engineers and customers demonstrates the role of continuous learning in engineering practice. All of the projects will require that basic science and engineering skills be applied to a realistic problem.

**Design Content Description**

**Approach:** Each student is expected to spend at least 12 hours per week earning the four units awarded by this course. Of these 12 hours, 4 are to be spent at the company site or interacting with company representatives and 4 more hours are to be spent during the working hours of 8-5 p.m., Monday through Friday, in order to ensure adequate contact with vendors and other working professionals. The final 4 hours includes the 1 hour formal class time, and 3 flexible hours. Students are required to schedule meetings for faculty assistance whenever called for by the timely execution of their projects.

**Lectures:** 100%

**Laboratory Portion:** 0%

**Grading Criteria:**

Attendance and Participation at weekly project reviews:	10%
Performance on weekly tasks assigned:	30%
Midterm review performance:	20%
Final Presentation:	20%
Company interaction:	15%
Group interaction:	5%
	100%

**Estimated ABET Category Content:**

Mathematics and Basic Science: \_\_\_ credit units or \_\_\_%

Engineering Science: \_\_\_ credit units or \_\_\_%

Engineering Design: 4 credit units or 100 %

**Prepared by:** Derek Dunn-Rankin **Date:** July 2007

**CEP Approved:** Fall 2001