

**1. Department, number, and title of course:** IE 677, Industrial Engineering Projects (Maximum of six credits to be earned for MIE degree.).

**2. Course (catalog) description:** Investigation and written report on assigned problems germane to industrial engineering.

**3. Prerequisites:** MIE candidates only.

**4. Textbook(s) and/or other required material:** No textbook is required. As needed, students refer to texts from preceding industrial engineering courses.

**5. Course objectives: By the end of the course the students will be able to:**

- a. Integrate and apply fundamental industrial engineering principles to formulate and solve a broad set of engineering problems.
- b. Design one or more alternative solutions to the current problem/project.
- c. Function effectively on multi-disciplinary teams.
- d. Communicate design recommendations effectively through written, oral and electronic formats.
- e. Apply engineering judgement, at an introductory level, in the creative process of engineering design.

**6. Topics covered (% of semester time):** Students work in two or three person teams on design projects over the course of the semester. For each project, students: (1) define, develop and present project scope (20%); (2) collect data, discuss options and alternatives, prepare preliminary design (20%); (3) select and formulate feasible solutions, prepare cost analysis, implementation plan, and document results (50%); and (4) present the results of their work in oral, written and electronic form (10%). All projects address team organization and management, professional practice and ethical issues.

**7. Class schedule, i.e. number of sessions each week and duration of each session:** 2 days per week, 1:30-3:20pm, 110 minutes per session. Lectures held primarily at beginning of semester on a scheduled basis. Team update sessions and site visits held on a flexible basis and may include additional lecture topics, team design activity, etc.

**8. Contribution of course to meeting the professional component:** 3 credit hours of engineering design. This course is a capstone design experience in solving industrial engineering problems typical of those the practicing industrial engineer is required to solve. Students work in teams to simulate professional practice, working on open-ended design projects often within easy driving distance from campus. Students integrate and apply numerous design concepts and theories from the broad discipline of industrial engineering.

**9. Relationship of course to program outcomes (Criterion 3):**

*N/A = not applicable, minor, moderate, or major contribution of course to Criterion 3 outcomes a-k*

<b>Outcome</b>	<b>Contribution</b>	<b>Course content related to outcome</b>
<b>a. Math, science, engineering</b>	Major	Students must apply principles of math, science, and engineering to evaluate, select and justify their designs.
<b>b. Design, conduct experiments</b>	Minor	Students formulate data requirements, establish procedures, collect and interpret data.
<b>c. Design system, component, process</b>	Major	Students must design a system or process to solve an engineering problem, given project or system constraints.
<b>d. Multi-disciplinary teams</b>	Major	Students function in teams capitalizing on specialties or diverse interests throughout the entire semester to generate their final design.
<b>e. Engineering problems</b>	Major	Students work independently and on teams to identify design constraints, conceptualize alternative solutions, collect required information, and solve the design problem.
<b>f. Professional; ethics</b>	Moderate	Students must demonstrate professionalism in their communication with project sponsors and/or advisors, and incorporate ethical considerations in their designs as appropriate.
<b>g. Communicate</b>	Major	Students must present the results of their design(s) in written, oral, and electronic form using appropriate presentation tools.
<b>h. Impact of engineering solutions</b>	Major	Students identify the impact of design solutions on project work environment, management, and employees.
<b>i. Life-long learning</b>	Moderate	Through project sponsors and/or advisors, students recognize the need for and benefit of professional development.
<b>j. Contemporary issues</b>	Minor	Students must identify and incorporate, when appropriate, contemporary issues into the development of design alternatives.
<b>k. Modern engineering tools</b>	Major	Students must apply a variety of computer aided modeling and design tools including, but not limited to, AutoCAD, Arena, Visio, MS Access, among many others.

**Relationship of course to program criteria (Criterion 8):**

This course contributes to the program criteria by addressing:

1. How practicing industrial engineers interact with employees, equipment, materials, and information in a variety of workplace environments and design demands.
2. Professional practice issues, such as communicating to all levels of labor and management, and the importance of sound engineering designs.
3. Technical demands and professional expectations of practicing industrial engineers.
4. Other professional practice issues (for instance, cost and economic analysis, professional ethics, and written, oral, and electronic communications).

10. **Person(s) who prepared this description and date of preparation:** Clarence L. Smith: Draft in February 2002; Updated in December 2003.