ME 4972 – Senior Design Project I

Credits and Contact Hours: 3 Credits. Two 120 minute meetings per week.

Instructors: Thomas Barber, Vito Moreno


Specific Course Information:
   a. Catalog Description: The first part of the senior design experience. It will cover topics on design process, planning, and costs. Design for manufacture and assembly will be covered. Both oral and written reports are required.

   b. Prerequisites: ME 3250
      Corequisites: ME 3227

   c. Required, Elective or Selected Elective: Required

Specific Goals:
   a. Course Outcomes: After completing ME 4972/3 students should be able to:
      1. Develop problem specifications.
      2. Brainstorm alternative solutions to problems.
      3. Select a final design approach and defend a critical design review.
      4. Understand how to schedule, plan and manage a project using CPM or PERT methods.
      5. Conduct analysis to substantiate design concepts.
      6. Deliver written documentation and oral presentations of items 1-5.
      7. Understand the ethical implications of engineering in the modern world
      8. Understand importance of intellectual property in the modern competitive world.

   b. Relationship of Course Outcomes to Criterion 3 Student Outcomes:
      a) an ability to apply knowledge of mathematics, science, and engineering:
         Students apply knowledge acquired in their undergraduate course work to the design of engineered systems and hardware.
      b) an ability to design and conduct experiments, as well as analyze and interpret data:
         Students demonstrate the ability to design and conduct physical and/or numerical experiments as well as analyze and interpret the data from these experiments.
      c) an ability to design a system, component, or process to meet desired needs:
         Students need to design a system, component or process to meet the stated needs of the customer (or sponsor).
      d) an ability to function on multi-disciplinary teams:
         The senior design capstone project requires students to work in multidisciplinary teams. Some of these teams may encompass different aspects of only Mechanical
Engineering while others may require the incorporation of other engineering disciplines (such as Electrical, Computer, and Chemical Engineering).

e) an ability to identify, formulate, and solve engineering problems:
Students learn to identify the design objective and constraints of the problem and then develop solutions.

f) an understanding of professional and ethical responsibility:
Students acquire an understanding of professional and ethical responsibility through course presentations, daily log entry, realistic design constraint treatment, the application of regulated standards to their work, and knowledge of patent and intellectual property law.

g) an ability to communicate effectively:
Students are required to complete two oral presentations and two written communications, both of which require graphical presentations.

h) the broad education necessary to understand the impact of engineering solutions in a global and societal context:
Students are required to produce designs that meet realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics, and societal impact. Students also acquire an awareness of various design considerations in regards to regulatory standards and ISO requirements.

i) a recognition of the need for, and an ability to engage in life-long learning:
Students gain an appreciation of the need for life-long learning by conducting independent literature reviews and researching project-related problems. Students learn about life-long learning in professional development through presentations from select alumni, and are formally introduced to graduate education as an opportunity for future intellectual development.

j) a knowledge of contemporary issues:
This project requires the design of solutions for problems that are being experienced by local industries.

k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice:
Students are required to solve a problem in accordance with the most recent design standards, such as: ASTM, ASME and ATM. As required by their projects, students may also have to apply other industry specific standards.

Topics Covered:

- Computer-aided design
- Brainstorming
- Group dynamics
- Creativity
- Design process and life cycle design
- Oral presentations
- Reports and written presentations
- Design failure
- Project planning and critical path methods
- Benchmarking
- Product liability