DESCRIPTION:
Student teams conduct major open-ended research and design projects. Elements of the design process including establishment of objectives, synthesis, analysis, and evaluation are integral parts of the capstone. Real-world constraints such as economical and societal factors, marketability, ergonomics, safety, aesthetics, and ethics are also integral parts of the capstone. 497: feasibility studies performed; 498: implementation, testing, and production of design. Includes guest lecturers, team presentations, team building sessions, team meetings, and guided discussions relating to design. Continuous interaction with faculty and outside professionals.

CONTACT HOURS PER WEEK: 2 Lecture, 1 Lab hours per week.

REQUIREMENT: This is a required course in the Mechanical Engineering Technology baccalaureate degree program.

PREREQUISITE(S): ENT 316 Project Management and senior standing

COURSE COORDINATOR: Professor David Hergert and Associate Professor Gary S. Drigel


COURSE OBJECTIVES & OUTCOMES
1. SD An ability to apply scientific reasoning and inductive logic to experimental design, including justification, conditional arguments, testing theoretical hypotheses, and decision analysis.

2. SD Convergent thinking is the ability to correctly hone in the best solution to a problem. Convergent thinking often requires taking a novel approach to the problem, seeing the problem from a different perspective, or making a unique association between parts of the problem.

3. SD Divergent thinking is the ability to consciously generate new ideas that branch out to many possible solutions for a given problem. Divergent Thinking includes originality and elaboration (the amount of detail provided).

4. SD An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology.

5. SD An ability to investigate all aspects related to the course, including environmental, cultural, ethical, moral, and historical frameworks.

6. SD An application of proper economic and management techniques in the investigation, analysis, and design of engineering systems
An ability to function effectively on teams, including exchanging conflicting ideas and differing viewpoints with other team members; modify ideas based on critical input from others; and defending the group’s solutions to outside critique.

A respect for diversity, including age, gender, religion, physical ability, sexual orientation, cultural values, and political views.

Independent Learning is the ability to complete a task without guidance. Goes beyond what is required.

Learning Outside the Classroom includes the ability to understand, interpret, and apply learned materials and concepts presented in different formats.

A commitment to quality, timeliness, and continuous improvement.

A comprehension of professional, ethical and social responsibilities.

**METHOD OF EVALUATION:**

ENT Department Standard for awarding letter grades: Each faculty member will use the following percentage scale in assigning letter grades in their courses, with the following allowances:
- the end (or ends) of any range can be adjusted by 1 point (+/-)
- the assignment of the D- or F may deviate by a few points (2-3) from the values shown
- faculty may elect to not use +/- grades

<table>
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<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A+</td>
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<td>90-92.9</td>
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**TOPICAL OUTLINE:**

- Introduction and Course Planning
- Project Management Overview
- Fundamentals of Engineering Design (based on course textbook)
- A Method to Quantify Consideration of Design Alternatives
- P&G Presentation & Recruiting Visit
- Preparing for a Career in Engineering Technology
- U.S. Patents and Copyrights
- What Comes After Senior Design
- Univ. of Toledo MS Program
- Report Formats
- Reflective Essay
- Meeting Journal
- Poster Guidelines
- Liberal Education at Miami
- Ethics in Engineering

**METHOD OF PRESENTATION:**
In this course, a variety of methods are offered to the students to enable them to develop their designs. There will be no structured weekly lectures as in other courses. Instead, there will be continuous interaction with faculty and outside professionals on a regular basis to discuss the various aspects of the projects and design in general. In each of these meetings, team coordinator will generate minutes that describe the discussions, activities to be conducted in the future, progress to date, and persons responsible for future tasks. These detailed minutes are to be kept within a loose leaf, three ring note book and updated at least weekly by the team coordinator. Each week the minutes are to be sent to the professor. As appropriate, seminars on topics relevant to the projects and design may be conducted by the faculty, students, and guest speakers from industry and other institutions.

**MIAMI UNIVERSITY LEARNING COMMUNITY**

Miami University is committed to fostering a supportive learning environment for all students irrespective of individual differences in gender, race, national origin, religion, handicapping condition, sexual preference, or age. Students should expect, and help create, a learning environment free from all forms of prejudice. Disparaging comments, sexist or racist humor, or questioning the academic commitment of students based upon these individual differences are behaviors that undermine our learning community. If such behaviors occur in class, please seek the assistance of your instructor or department chair.

Prepared by: Gary S. Drigel 3/2013