Instructor: ??????  
Office Location: ????????  
Office Hours: ????????. In addition, unlimited office hours will be available per appointment.  
Email: ????????  
Telephone: (617) 989-???????

Meeting Times and Credits:

This is a four-credit course. There will be two hours of lecture per week and two laboratory sessions per week. Each laboratory session is two hours long.

Attendance:

Attendance will be taken at every class meeting. Each student is expected to strive for 100% attendance. (details of class and college policies in General Class Policies section)

Catalog Description:

This course is the first in a sequence of design courses introducing students to the fundamentals of engineering design and professional practice. Design problems are selected from various engineering disciplines. Students learn about the design cycle and the necessary steps to complete a successful project as a member of a team. Topics include problem identification, brainstorming, project planning, and design alternatives. Cost, safety and environmental issues are considered as well as ethical and professional responsibilities. Students present formal oral presentations and written reports of their designs.

Prerequisites:

MATH285 - Engineering Calculus I  
ENGL100 - English I

Textbook:

Engineering Design: A Project-Based Introduction 4e Student Value Edition  
for Wentworth  
By Dym  
ISBN: 978-1-119-06821-1
Course Goals and Learning Objectives:

1. To develop a basic understanding of the various steps in the design process typically encountered in the field of engineering.

2. To become familiar with several computer related skills necessary to function as a practical engineer.

3. To develop an understanding of how to attack and solve a poorly defined problem - from basic literature search, through planning to a finished and tested prototype.

4. To develop an awareness of (a) analytical thinking, (b) decision-making skills, (c) communication skills, and (d) the design process.

5. To gain an awareness of team building skills and general business acumen.

6. To gain an awareness of the application of technology to solve contemporary societal issues.

Learning Outcomes:

By the end of the course the students will demonstrate:

- Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (ABET c)

  *Assessed in Final Report - Rubric Attached*

- Ability to communicate effectively (ABET g)

  *Assessed in continuously throughout the semester - Rubric Attached*
General Course Requirements and Work Schedule:

Introduction to Engineering Design will serve as the students' first experience with the design process. Students will be guided through various multi-step design processes throughout the semester. Emphasis will be put on problem identification, brainstorming, project planning, design layout, design evaluation, and design improvements. Lectures will cover topics related to Engineering Design and the Engineering Profession as well as addressing concepts related to the current projects being worked on in the lab.

**General Expectations**

This course will require extensive reading prior to class and in-class discussion of the topics for the week. Quizzes will be given approximately weekly to ensure that readings are kept up with. There will be several case studies to be analyzed with recommendations to be made based on sound logical arguments.

**Guided Design Overview**

Through the week of the semester, the students will be guided though a predetermined engineering design project. This will serve as a means to introduce the concepts of defining a design problem, conducting effective research, producing the design, and reporting on the findings. At the completion of this component, there will be a formal report on the design as well as an examination on the design process.

**Group Design Component**

Each freshman student is required to work in a team to complete a design from the attached list of loosely defined projects. The instructor will provide the list of design projects in the second week of the semester. Each group will select a topic and work through the design process with close guidance from the instructor. At the conclusion of the semester, each group will produce one formal report, one poster presentation, and a formal oral presentation.

**Project Proposal and Approval (Due TBA)**

Each design team is expected to produce a design proposal before beginning their design project. This will include a description of their design problem, include all preliminary research, and also address the proposed approach to solving the design problem. Each proposal must be approved by the instructor prior to starting the design.

**Design Memorandum (Due weekly)**

During the group design project, each group member will be required to produce and submit a design memorandum to the instructor. This memorandum is intended to inform the instructor of your progress through the design process as well as address any problems/hurdles that the design team may have encountered during the design process. The details of this memorandum will be addressed during the lecture component of this course.

**Electronic Portfolio**

An electronic copy of all your work burned on a CD or saved to a flash drive is required at the end of the semester to be submitted to the course instructor. This includes copies of all reports, memoranda, proposal, computer code (if applicable), photographs of the hardware, and PowerPoint presentations. The format for this will be provided in a subsequent lecture.
Record Keeping and Engineering Notebook (Examined weekly)

Throughout the semester, each student is expected to maintain an engineering notebook. This notebook must be an electronic journal that documents each student's individual contribution to the design project. Throughout both the guided as well as group design projects, the students will maintain this notebook using common engineering standards. This notebook will be used solely for the design projects and should not include lecture notes. At the end of each design project, this notebook will be collected and reviewed for completeness and organization. The details of how to maintain an engineering notebook will be addressed during lecture in the first week of class.

Weekly Quizzes and Homework (Weekly)

Throughout the semester, quizzes and/or homework assignments will be administered that assess each student's understanding of the lecture material. These quizzes/homeworks may take the form of an inclass written, or online, quiz or a take home assignment to be completed outside of the classroom.

<table>
<thead>
<tr>
<th>Evaluation and Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Final</strong></td>
</tr>
<tr>
<td>Presentations</td>
</tr>
<tr>
<td>Reports</td>
</tr>
<tr>
<td>Attendance</td>
</tr>
<tr>
<td>Instructor Points</td>
</tr>
<tr>
<td>Quizzes</td>
</tr>
<tr>
<td>Poster</td>
</tr>
</tbody>
</table>

**BONUS:** Bonus points will be awarded to any student that becomes a member of an international professional engineering society, such as IEEE, ASCE, or ASME. This must be the parent organization and not simple a member of the WIT student chapter. For credit, you must show a society magazine with your name on the address label to the instructor. (credit amount TBD)

**BONUS:** Students can also receive bonus credit for attending senior design project presentations. (credit amount TBD)

General Class Policies

**Reporting Standards**

All written reports and memos must be type written. All written reports and memos must meet the standards of English I. Poorly written papers will be returned to the students, without grade, for revision. Students are encouraged to utilize the Center for Teaching and Learning Facility for help in polishing their papers. In addition, the Center for Teaching and Learning, located in Beatty 402, offers FREE tutoring in a number of subjects from all departments, and is open Monday-Friday (Monday-Thursday in the evenings). You are encouraged to visit the CTL website http://www.academics/resource to make an appointment if you need extra help with your courses.
Attendance

Attendance is expected at all class. Attendance is taken at the beginning of class. If a student is not present when attendance is taken, they are counted absent for the entire class (even if they are 'only 1 or 2 minutes late'). Excused absences are only allowed for legitimate reasons judged by the Professor as justifiable and unavoidable.

Attendance (Wentworth policy)

Students are expected to attend classes, take tests, and submit papers and other work at the times specified by the instructor. Students who are absent from class or studio will be evaluated by faculty responsible for the course to ascertain their ability to achieve the course objectives and to continue in the course. Instructors may include, as part of the semester's grades, marks for the quality and quantity of the student's participation in class.

A student who is absent from class on the day of a previously announced examination, including the final examination, is not entitled, as a matter of right, to make up what was missed. The instructor involved is free to decide whether a make-up will be allowed.

A student who is absent from class is responsible for obtaining knowledge of what happened in class, especially information about announced tests, papers, or other assignments.

At the discretion of the instructor, a student who misses 15 percent of classes (attendance and assignments) may be withdrawn from the course by the instructor. A grade of WA will appear on the student's official transcript as a result. Wentworth reserves the right to take academic action against any student who does not attend class or studio and/or who does not take tests or submit papers and other work at the times specified by the instructor.

Attendance (ENGR 160 policy)

For each day (lecture or lab) missed without prior notification (email to instructor), the final course score will be deducted by 1.5%. Therefore, 7 unexcused absences will lower the final course grade by 10.5% (one full letter grade). If a student needs to miss a lecture or laboratory, they must inform the instructor prior to the scheduled meeting time, stating the reason for the absence. If a student misses a total of 7 days, a warning will be provided. If 10 days are missed then the student will be academically withdrawn from the course.

Each student will be responsible for all material from any missed lecture or lab. Therefore it is imperative that all notes, announcements, and handouts are obtained by the student in the event of an absence.

Classroom Behavior

Students are expected to conduct themselves in a professional manner during both lecture as well as in the laboratory. If a student is perceived as being disruptive, they may be asked to leave and receive a deduction of one day's absence. Examples of behavior that is considered disruptive would include:

- Use of any electronic device during lecture that is considered not necessary for the current material. This includes the use of any laptop, cellphone, or other communication device not necessary for that day's lecture
- During lab, using any device that is unrelated to the lab tasks.
- Talking during lecture to fellow students on topics unrelated to the course.
- Working on assignments for other course.
- Eating in either the lab or during lecture.
- Having any material displayed on your computer that may be considered offensive. This can include a desktop background, any audio, or screen saver that is not appropriate for a professional environment.
## Semester Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topic</th>
<th>Chapter in Text</th>
<th>Assignments</th>
<th>Design Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (a) (1/7)</td>
<td>Engineering Design and the Design Process</td>
<td>1, 2</td>
<td>Guided</td>
<td></td>
</tr>
<tr>
<td>1 (b) (1/9)</td>
<td>Team Organization and Leadership</td>
<td>10</td>
<td>Guided</td>
<td></td>
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<tr>
<td>2 (1/12)</td>
<td>Research and Technical Writing Concepts</td>
<td>Handout</td>
<td>Semester Project Consultation</td>
<td></td>
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<tr>
<td>3 (1/21 Lab)</td>
<td>Needs Assessment</td>
<td>3</td>
<td>Semester Project Consultation</td>
<td></td>
</tr>
<tr>
<td>4 (1/26)</td>
<td>Problem Formulation / Design Goals</td>
<td>4</td>
<td>Semester Project Proposal</td>
<td></td>
</tr>
<tr>
<td>5 (2/2)</td>
<td>Evaluation Criteria and Design Evaluation</td>
<td>5</td>
<td>Semester Project Consultation</td>
<td></td>
</tr>
<tr>
<td>6 (2/9)</td>
<td>Modeling, Analysis and Optimization</td>
<td>6</td>
<td>Semester Project Consultation</td>
<td></td>
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<tr>
<td>7 (2/18 Lab)</td>
<td>Presenting Technical Data to a Non-Technical Audience</td>
<td>9</td>
<td>Semester Project Consultation</td>
<td></td>
</tr>
<tr>
<td>8 (2/23)</td>
<td>Mid-Semester Presentations</td>
<td></td>
<td>Presentations</td>
<td></td>
</tr>
<tr>
<td>9 (3/2)</td>
<td>Critical and Creative Thinking</td>
<td>Handout</td>
<td>Semester Project Consultation</td>
<td></td>
</tr>
<tr>
<td>10 (3/16)</td>
<td>Ethics and Product Liability</td>
<td>12</td>
<td>Semester Project Consultation</td>
<td></td>
</tr>
<tr>
<td>11 (3/23)</td>
<td>Intellectual Property</td>
<td>Handout</td>
<td>Semester Project Consultation</td>
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</tr>
<tr>
<td>12 (3/30)</td>
<td>Sustainability and “Green Engineering”</td>
<td>11</td>
<td>Final Consultation</td>
<td>Showcase Posters Due</td>
</tr>
<tr>
<td>14 (4/6)</td>
<td>Final Presentations</td>
<td></td>
<td>Watson Auditorium</td>
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<tr>
<td>15 (4/13)</td>
<td>Finalize Papers</td>
<td></td>
<td>Final Design Papers Due</td>
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</tbody>
</table>

*Semester schedule subject to change*