"Find the gift God gave you. Sharpen, hone, and train it. And, then go use it. Go!" - Donald P. Shiley '51

Course Description: Students are required to do design projects including literature search, engineering analysis, and written and oral presentations. These projects are a culminating experience in the mechanical engineering program. Group projects and construction of prototypes is encouraged, where feasible.

Prerequisites: Prerequisite: EGR 300. Strongly recommended: ME 332, 336, 401, 322

Credits: 2

Schedule: Friday 2:40-5:40 PM

Course Instructor: Dr. Heather Dillon
Office: 214 Shiley hall (**Office has moved!)
Phone: 503-943-7309
Email: dillon@up.edu

Office Hours: Monday: 1:00-3:30 pm, Thursday 1:30-3:30 pm and additional times as posted on my door. Also by appointment or whenever I am free in my office

Textbook: No textbook required.

Website: Wordpress/moodle - http://wordpress.up.edu/egrcapstone/

Communication: Students are responsible for checking university e-mail and the course website frequently.

Documents: Project reports and deliverables are posted and are due on the date noted on the website. Your completed documents must be posted on your project website to count. No late work will be accepted.

Feedback: Feedback is very welcome and important to improve the course! Share your suggestions or comments about the course with the instructor via email or during office hours.

Course Objectives:
- **Engineering design:** Students can design a technical solution to an open-ended, complex problem subject to multiple constraints.
- **Communication:** Students can organize communications clearly and effectively for the intended audience.
- **Ethical project management & teamwork:** Students can work as a team to define the scope and objectives of a complex project, identify realistic constraints and appropriate industry standards, produce solutions, prepare necessary communications, and meet the related milestones in a timely manner and with quality deliverables. Students can effectively communicate and collaborate such that individual members are mutually reliable throughout the project to accomplish the final objective.
Throughout this process, students demonstrate ethical & professional behavior with respect to peers, faculty, clients, and other stakeholders.

**Grading:**
Your grade in this course depends not only upon your ability to design a feasible, technical solution, but also your ability to function effectively on a team and communicate with others about your project. While the team’s overall performance has a large impact on the grade, all grades will be assigned individually and, thus, grades assigned to members of the same team may be quite different. Grades are based upon the observations of your teammates, the faculty, and your industry advisor/mentor/client, as follows:

1. Engineering design (technical content and quality)  
2. Communication (logbook, website, updates, reports)  
3. Ethical project management & teamwork  
4. Mechanical Engineering Comprehensive Examinations

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade Range</th>
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<tbody>
<tr>
<td>45%</td>
<td>A range (A- to A)</td>
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<tr>
<td>25%</td>
<td>B range (B- to B+)</td>
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<tr>
<td>20%</td>
<td>C range (C- to C+)</td>
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<tr>
<td>10%</td>
<td>D range (D- to D+)</td>
</tr>
<tr>
<td>Less than 60%</td>
<td>F</td>
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At the completion of the course, the scores from the above distributions will be combined into a letter grade according to the following scale:

- Above 90%     A range (A- to A)  
- 80%-90%       B range (B- to B+)  
- 70%-80%       C range (C- to C+)  
- 60%-70%       D range (D- to D+)  
- Less than 60% F

**In-class Exercises:**
Often during lecture an exercise problem or activity will be assigned. Students are required to complete the activities in good faith. Activities will be collected randomly.

**Deliverables:**
- **Project website** (due Fall semester approximately mid-semester). This will be used to post all team deliverables and updates.
- **Industrial Advisor worksheet** – a concise memo describing the results of your meeting with them especially in regard to the expected role of your industrial advisor.
- **Project Plan** – a memo discussing the literature search and other early design process outcomes. Should include a detailed description of the team’s proposed project and including their plan. Details will be provided by the instructor.
- **Project Design Report** - The report will include information about the “prototype demonstration”. Generally, this will require construction of some very simple physical artifact for them to learn how they will resolve their biggest obstacles. This document will include a prototype testing plan, evidence of engineering models developed, and document the design process. Teams should have identified major concerns or obstacles that will need to be addressed before a successful project is completed in the spring.
- **Posters Presentations** (formal presentation with visuals). This is a status presentation near the end of the fall semester. Specific poster requirements will be provided closer to the poster date. A prototype is strongly encouraged for most teams at the poster presentation.
- **Weekly Updates** (posted on each team website). Details will be provided by the instructor.
- **Design Logbook** - This is intended to improve documentation and help students reflect on the design process. The logbook will be reviewed periodically by the instructor.
- **Final Product**, if something other than, or in addition to a written report is a component of the project (e.g., prototype, model, software).
- **Group peer evaluation** due at the end of the spring semester.
- **All teams** must leave all scheduled class times open for any announced class meetings and other meetings with advisors.
• **Honors Program Students:** Each honors student prepares an individual paper suitable for publication based on his/her senior design project (or a directed research project), and submits to Dr. John Orr and copies the faculty advisor and course instructor. Students should consult with Dr. Orr regarding the requirements for that paper.

**Grading Criteria:**

1. **Engineering Design:** Grading is based on the following criteria:
   - Effectiveness of design incorporating a variety of constraints.
   - Other aspects of the design related to desirability by the customer/client.
   - Affordability of the solution (e.g., life-cycle costs).
   - Evidence of using engineering standards - include at least one paragraph in the final report discussing what standards were used and how they were useful.

2. **Communications:** Grading is based on the following criteria:
   - Note: Faculty will provide a detailed list of requirements for the presentations and reports.
   - Communication quality of written reports
   - Communication quality of oral presentations/reports
   - Communication quality of website materials and weekly updates

   *All reports (written and oral) must be well organized, clear, and easy to follow with clear evidence of the design process, and conclusions that are substantiated by facts and data.*

3. **Ethical Project Management & Teamwork:** Grading is based on the following criteria:
   - Steady progress throughout the semester with milestones met using a defined schedule.
   - Quality and timeliness of Weekly updates
   - Group works together as a team in making decisions, scheduling and assigning tasks, and preparing memoranda and reports. All group members are kept informed of each other’s progress and findings.
   - The group shares tasks equitably among its members.
   - Proper respect for the School’s laboratories, tools, equipment, etc. Use of laboratories requires written permission from the course instructor and appropriate technician prior to use.
   - Overall conduct is professional, respectful, and honorable.

   Note: As applicable based on the nature of the team project, students will be required to have shop training.

4. **Comprehensive Examinations:**

   **ME481:**
   - Professional Issues exam (score at or above 60% is passing). Failure of the exam reduces the overall course grade by 5 percentage points.
   - ME Comprehensive exam – Part 1 (score at or above 60% is passing). Failure of the exam reduces the overall course grade by 5 percentage points.

   **ME482:**
   - ME Comprehensive exam – Part 2 and 3 (score at or above 60% is passing). Failure of the exam reduces the overall course grade by 5 or 10 percentage points.
   - Incorporation in the final report of at least one engineering drawing that meets drawing standards per ME team member
   - Senior exit surveys

**Electronic Device Policy:**

Students are encouraged to use phones/tablets/laptops during class to facilitate learning as part of scheduled activities. Devices may not be used outside the scheduled activity time (during lecture or discussion).
Disruptive behavior is prohibited (ringers on mute please). Audio or video recording of the class is not allowed without prior written approval by the instructor.

**University of Portland’s Code of Academic Integrity**

Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity.

The complete code may be found in the University of Portland Student Handbook and as well the Guidelines for Implementation. It is each student’s responsibility to inform himself or herself of the code and guidelines.

**Mechanical Engineering Code of Professional Behavior**

As you prepare for your career as a working engineer it is critical to develop professional habits. To encourage this in all class meetings I reserve the right to deduct up to 5% of the final grade for violations of professional behavior. This includes, but is not limited to, the following activities.

- Disrespectful behavior toward other students. This includes behavior in your project groups.
- Repeated requests for assignment extensions.
- Repeated or excessive class absences.
- Repeated or excessive disruptions during class lectures.
- Disrespectful behavior toward the instructor.

The following professional behaviors are strongly encouraged in all class activities. I reserve the right to add up to 5% to the final grade for demonstrated excellence in professional behavior.

- Responding helpfully to questions from other students.
- Assisting other students with homework, class activities, or study groups.
- Working as an excellent team member on all group projects and reports.
- Participating in class discussions and actively seeking knowledge.
- Taking responsibility for your own decisions in class and class materials.
- Being present and committed to all class activities.

**Assessment Disclosure Statement**

Student work products for this course may be used by the University for educational quality assurance purposes.

**Accommodation for Disability & Emergency Information**

If you have a disability and require an accommodation to fully participate in this class, contact the Office for Students with Disability, located in the University Health Center (503-943-7134), as soon as possible.

**Transportation Policy**

If you plan to drive to off-campus events as part of this course, you must read the University Vehicle and Transportation Policy for Students: [http://www.up.edu/showimage/show.aspx?file=21092](http://www.up.edu/showimage/show.aspx?file=21092). The policy requires drivers of private or University vehicles to attend a one-time safe driving course, offered by Public Safety, and to submit a trip itinerary to Public Safety prior to each off-campus trip. The itinerary form must be signed by the instructor.
Course Schedule: Attendance is mandatory.

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<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Deliverables</th>
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</table>
| 1    | 8/29 | • Project and course introduction  
• Course deliverables discussion  
• Roles of Industrial Advisors, Faculty Advisors  
(and all faculty), Instructor.  
• Budget issues and fundraising process  
• Leadership and teamwork  
• Introduction to the design process |  |
| 2    | 9/5  | • Introduction to the design process  
• Problem definition  
• Super-Group meeting w/ faculty advisor |  |
| 3    | 9/12 | • Concept development  
• 4pm – Meet and greet with industry advisors. | Meet with industry advisor and fill out roles worksheet. |
| 4    | 9/19 | Shop training and website tutorial (with EGR 483) | Project Plan (draft) Due |
| 5    | 9/26 | No class – Presidential Installation. | Weekly updates move to your website |
| 6    | 10/3 | • Exploration of design  
• Super-group meetings | Project Plan (final) Due |
| 7    | 10/10 | • Prototyping (purpose and requirements).  
• Engineering standards, drawing standards,  
patent search/literature search. | Logbook check-in |
| 8    | 10/17 | Fall Break – No class |  |
| 9    | 10/24 | • Project management and planning (with EGR483)  
• Super-group meetings | Project Budget Due |
| 10   | 10/31 | • Engineering Profession and resumes  
• Professional Issues Exam | Project Time Budget Due  
Professional Issues Exam |
| 11   | 11/7 | ME Comprehensive Exam | ME Comprehensive Exam |
| 12   | 11/14 | • Generation of design  
• Refinement of design  
• Career panel (with EGR483) | Project Design Report (draft) Due |
<p>| 13   | 11/21 | • Communication of design | Logbook check-in |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>Thanksgiving Break – No class</td>
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</tr>
<tr>
<td>15</td>
<td>Poster Presentations</td>
<td>Project Design Report (final) Due</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Posters and presentation materials.</td>
</tr>
</tbody>
</table>

Weekly updates should be posted on the team website and tagged “weekly” by Monday at noon of each week. Course schedule is subject to change, check website for updates.

Provide hardcopies to the faculty advisor (unless they have requested only softcopies) for all submitted work. Electronic copies should be placed in on the team website. If it is not on your website it never happened.