

ME 481 – Mechanical Engineering Project I (2 credits)

Fridays 2:40 – 5:40 p.m.

"Find the gift God gave you. Sharpen, hone, and train it. And, then go use it. Go!"

-Donald P. Shiley '51

ME 481/482 are the *capstone* experience for Mechanical Engineering students. It is your opportunity to demonstrate to yourself and to potential employers your abilities. The Mechanical Engineering faculty are here to assist. We hope you take great pride in this project!

ME481

Instructor: Dr. Ken Lulay; lulay@up.edu; SH 236, 503-943-7432

Office Hours: Monday: none scheduled, Tuesday: 10:00-12:00, Wednesday: 12:00-1:00, Thursday 11:00-12:00, Friday: 12:30-1:30, and whenever I am free in my office.

Text: There is no textbook for this course.

ME482 (Spring semester)

Instructor: Dr. Khan, khan@up.edu; SH 219, 503-943-7276

Office Hours: TBD for spring

Text: There is no textbook for this course.

WEBSITE: The course website will be used extensively in this course. Deliverables (submitted work) for the course (and project) and class schedule are defined on the website. All teams will maintain their own wordpress project site. The URL: <https://sites.up.edu/egracapstone/>

BULLETIN 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..

STUDENT OUTCOMES:

- Engineering design: Students can design a technical solution to an open-ended, complex problem subject to multiple constraints. Students demonstrate integration of engineering standards in their design.
- Communication:
 - Quality Students can organize written communications clearly and effectively for the intended audience.
 - Effectiveness: Students demonstrate an ability seek assistance from advisors, faculty and peers appropriately and keep advisors and faculty adequately informed of their project needs and progress. Students are to check their UP emails daily to keep informed. Students demonstrate an ability to assume full responsibility for effective communication.
- Ethical project management, teamwork and professional responsibility:
 - 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.
 - Students articulate what contemporary issue is addressed by the project, what the responsibility of an engineer is to address that contemporary issue, and what impact the engineering solution may have in a global and societal context.

COURSE GRADE: 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:

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|---|-----|
| 1. Engineering design (technical content and quality) | 45% |
| 2. Communication | 25% |
| 3. Ethical project management & teamwork | 20% |
| 4. Mechanical Engineering Comprehensive Examinations | 10% |

A	90 – 100%	D	60 – 69%
B	80 – 89%	F	<60%
C	70 – 79%		

+ or – designations apply to grades within 2.5% of a boundary between grades.

ME 481 DELIVERABLES:

For details: <http://faculty.up.edu/lulay/ME481-482/Deliverables-Details-F2015.pdf>

Deliverable	Due date
Project Charter	September 7, 8AM
Memo: Industrial Advisor summary	September 18
Project Plan	September 25
Project website launched	October 2
Memo: Integrated testing demonstration	October 30
Memo: End of semester	December 4
Group peer evaluation	December 4
Poster presentation	December 11

Periodic Deliverable	Description	Due
Weekly meeting minutes/notes	Emailed to faculty advisors, industrial advisors, course instructor and posted on the course web page	Every week, at the latest, due Friday before class

- **Honors Program Students:** Each honors student prepares an individual paper based on his/her senior design project (or a directed research project), and submits to Dr. John Orr. Students should consult with Dr. Orr regarding the requirements for that paper. A copy of the paper must also be submitted to the instructor for the senior capstone course by the last day of classes.

TENTATIVE ME 482 DELIVERABLES (subject to change in the spring):

- Weekly meeting minutes/notes will continue
- Group peer evaluations will be due at the end of the semester
- A final design report will be due near the end of the semester. Since this is your capstone project, you should take great pride in it; therefore, the report you submit must be professionally bound (the print shop can do this). You are encouraged to make bound copies for each team member as well. Details will be provided in ME482, but the grading criteria below will apply.
- Each individual student is to include as an appendix their contribution to the project by including at least one Design Increment Document (DID). Each student is also to create and include at least one engineering drawing that meets engineering drawing standards.
- A final formal oral presentation will be given by the team near the end of the semester.
- Specific requirement will be provided in ME 482.

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 both the mid-project memo (ME481) final report (ME482) discussing what standards were used and how they were useful. This paragraph must have a heading that reads: "**Engineering Standard**"

2. Communications: Grading is based on the following criteria. Faculty will provide a detailed list of requirements for the presentations and reports.

- Communication quality of written reports
- Communication quality of oral presentations/reports
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.
- Effectiveness: did you communicate effectively to advisors and faculty and seek assistance as appropriate? Did you check email regularly? Did you communicate with team members? Did you provide all constituents weekly updates? Did the team meet at least weekly?

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.
- Articulate the contemporary issue, professional responsibility and impact of the project in the final memo in ME481.
- 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.
- Senior exit surveys

Tentative Class Schedule:

Week	Date	Topics (Attendance is mandatory.)
1	Sept 4	<ul style="list-style-type: none"> • Project and course introduction (purpose and expectations) • Deliverables due next week (and for whole project). • Roles of Industrial Advisors, Faculty Advisors (and all faculty), Instructor. • Team work, communications, project management. • Budget issues and fundraising process • Introduction to the design process
2	Sept 11	<ul style="list-style-type: none"> • Introduction to the design process: problem definition (project criteria, etc.) • Super-group meetings
3	Sept 18	<ul style="list-style-type: none"> • Concept development • Role of testing and prototyping in design
4	Sept 25	<ul style="list-style-type: none"> • Shop training/website tutorial for web-master
5	Oct 2	<ul style="list-style-type: none"> • Career services – improving your job search skills
6	Oct 9	<ul style="list-style-type: none"> • Scheduled meetings with instructor
7	Oct 16	<ul style="list-style-type: none"> • No class – ‘cause it’s the Friday before break, duh.
8		FALL BREAK
9	Oct 30	<ul style="list-style-type: none"> • Exploration of design • Super-group meetings
10	Nov 6	<ul style="list-style-type: none"> • Engineering profession (including discussion of end-of-semester memo) • Professional Issues Examination
11	Nov 13	<ul style="list-style-type: none"> • ME Comprehensive Examination
12	Nov 20	<ul style="list-style-type: none"> • Communication of design work – posters and Design Increment Documents (formerly, Design Decision Documents)
13	Nov 27	<ul style="list-style-type: none"> • Thanksgiving break (no class)
14	Dec 4	<ul style="list-style-type: none"> • Review and reflection on the project’s design process • Career panel
15	Dec 11	<ul style="list-style-type: none"> • Poster presentations

You WILL NOT BE REMINDED of these as they approach – students are expected to keep track of them themselves! See course website for descriptions of items due.

UNIVERSITY-WIDE POLICIES:

University’s Code of Academic Integrity	<i>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. (Taken from the University of Portland’s Code of Academic Integrity.)</i>
University’s Assessment Disclosure Statement	<i>Student work products for this course may be used by the University for educational quality assurance purposes.</i>
University’s Disabilities Statement	<i>If you have a disability and require an accommodation to fully participate in this class, contact Accessible Education Services (AES), located in Buckley Center 163, as soon as possible. If you have an AES Accommodation Plan, you should make an appointment to meet with me to discuss your accommodations. Also, you should meet with me if you wish to discuss emergency medical information or special arrangements in case the building must be evacuated.</i>
Green Dot Statement	<i>University of Portland Faculty, Staff, and Students are committed to creating a community free from interpersonal violence, in which all members feel safe and respected. Each of us has a personal responsibility to reject violence or intimidation of any kind. Resources for those experiencing or wishing to report violence can be found on our Community Against Violence website: http://www.up.edu/cav.</i>
Lab, Shop Access, Safety	For courses with labs and/or projects, the suggested statement is as follows:

Policy (if applicable to the course/lab)	No one is allowed to work in the shops without appropriate training from the shop technician and without instructor permission. If students require card access to a lab, they must receive training from a technician. No food or beverages (including water bottles) are allowed in the computer classrooms, shop, or labs.
Transportation Policy (if applicable to the course)	For courses that require students to drive to off-campus meetings, plant tours, field work, or any university sponsored activity, the suggested statement is as follows: 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 . 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.
Group Process Assistants (if applicable to the course)	<i>Teamwork is expected in this course. Teams are encouraged to consult with Group Process Assistants, located in Buckley Center 163. Group Process Assistants provide help to groups to systematically think about their social, task, and procedural needs.</i>