Mechanical & Materials Engineering
Engineering Building, Suite 400
www.pdx.edu/mme
503-725-4290

Portland State UNIVERSITY

Course Number & Title	ME 491: Design Process
Credits	2
Required or Elective	Required
Prerequisite(s)	Admission to upper division MCECS Program, ME 314, ME 322, ME 351 and Wr 327
Days/Time	Tuesdays, 10:00 – 11:50 AM
Location	Shattuck Hall 212
Instructor	Dr. Gerald Recktenwald, gerry@pdx.edu, 503-725-4296
Teaching Assistant	Ryan Catabay, rcatabay@pdx.edu
Office Hours	Tuesdays, 2:30 – 4:00 PM, Thursday, 10:00 – 11:30 AM
Public Web site	http://web.cecs.pdx.edu/~gerry/class/ME491
Textbook	Fundamentals of Product Development, 4th ed., Christopher A. Mattson and Carl D. Sorenson, 2016, Brigham Young University, ISBN 9781537084800. The 5th edition was released in August 2017, and that is a little better than the 4th edition.

Course Description:

ME 491 is a required course in the BSME program, and it is typically taken in the fourth year. The primary goal is to develop design skills in mechanical engineering majors.

In ME 491 we introduce a structured design process and apply it to projects that students complete in teams. At the end of ME 491, students organize themselves into teams that will complete a major project during ME 492 and ME 493 in the Winter and Spring terms of 2018.

Course Learning Objectives – Students must demonstrate ABET Student Outcomes*

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1. The ability to translate customer needs into engineering requirements.	c
2. The ability to use physical prototypes to explore design options and measure performance of engineering subsystems.	b, c
3. The ability to effectively communicate design concepts and decisions in writing and orally.	g
4. The ability to form a team that has explicitly articulated set of shared values.	d, f
5. The ability to make sustained and substantive contributions to team goals.	d
6. The ability to submit a project proposal to a sponsor that demonstrates an understanding of your client's needs and that includes a reasonable plan for meeting those needs.	c, d, g

*Program Outcomes are Learning Outcomes for the entire BSME Program. Refer to the standard ABET learning outcomes listed at abet.org. For example, outcome "c" is "An ability to an 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".

Grading

Weekly individual homework	15 %	Individual score
Weekly group homework	30 %	Group score, assigned groups
Design competition	15 %	Group score, assigned groups
Peer evaluation	20 %	Individual score: 50% for assigned group, 50% for chosen group
ME 492-3 project proposal	20 %	Group score, chosen group

Policies

Homework is due in a D2L drop box, 5 minutes before the beginning of class on the due date.

Group Work: ME 491 requires extensive collaboration in groups. Individuals are expected to act professionally, and adhere to the PSU Code of Student Conduct, which is published at https://www.pdx.edu/dos/psu-student-code-conduct. To facilitate collaboration, group members are expected to share their PSU email addresses. Having possession of another student's email address does not give you permission to contact that person for purposes other than work on the course. Unwanted contact or harassment of another person will not be tolerated, and if it occurs, should be brought to the attention of the instructor (G. Recktenwald).

The course work will involve individual and group assignments. For the individual assignments, students are expected to submit work that is substantially the result of their own effort. Study groups, discussion of assignments among students, collective brainstorming for solutions, and sharing of advice are encouraged. Copying of assignments, computer files, graphs, or other means of duplicating material that is turned in for grading is *forbidden*. Prohibited collaboration (also known as "cheating") on any assignment (quizzes, homework, lab assignments and exams) will result in a zero grade for the assignment.

Accommodations: If you have a disability and are in need of academic accommodations, please notify me (G. Recktenwald) immediately to arrange needed supports. If you need information about disabilities, please contact the Disability Resource Center, 116 Smith Memorial Student Union, 503-725-4150 or via the web at http://www.pdx.edu/drc/.

Course Topics

Refer to the *lecture* page (http://web.cecs.pdx.edu/~gerry/class/ME491/lecture/) on the public web site for more detailed description of these topics.

1. Introduction; Overview of design processes.
2. Design Process, Internal search in conceptual design
3. Project planning, External search in conceptual design
4. Opportunity development, Customer requirements
5. Project Planning; Concept Development
6. Concept Development, Overview of Projects for ME 492-493;
7. Project planning; Presentation of projects for ME 492-493, Project proposal requirements and writing
8. Subsystem design; Presentation of projects for ME 492-493
9. Presentation of projects for ME 492-493
10. Design competition

Computer and E-mail Accounts

- If you haven't done so already, please go to the CADLab located in EB 325 to activate your engineering account. If you need help in using this account, please see the attendant or send an e-mail to support@cecs.pdx.edu
- If you choose not to check your CECS e-mail account regularly (yourname@cecs.pdx.edu) then please forward it to an e-mail account that you do check. Important information and announcements are delivered via this e-mail address.

Code of Conduct

The PSU Student Conduct Code prohibits all forms of academic cheating, fraud, and dishonesty. Further details can be found in the PSU Bulletin. Allegations of academic dishonesty may be addressed by the instructor, and/or may be referred to the Office of Student Affairs for action. Acts of academic dishonesty may result in a failing grade on the exam or assignment for which the dishonesty occurred, disciplinary probation, suspension or dismissal from the University. The students and the instructor will work together to establish optimal conditions for honorable academic work. Questions about academic honesty may be directed to the Dean of Student Life: http://www.pdx.edu/dos/student-conduct-at-psu/).

Classroom Rules and Behavior Expectations

The classroom is a professional space and professional conduct is expected. Please silence your cell phone and refrain from text messaging during class and exam times. Treat your fellow students and the instructor with respect and please use appropriate language at all times. Additional rules may be added at the instructor's discretion.

Ethics and Professionalism

As future professional engineers you should plan to take the FE Exam (see the Oregon State Board of Examiners for Engineering and Land Surveying at www.oregon.gov/OSBEELS), and you should be familiar with the ASME Code of Ethics (http://www.asme.org/), which includes the following:

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

1. *Using their knowledge and skill for the enhancement of human welfare;*
2. *Being honest and impartial, and serving with fidelity their clients (including their employers) and the public; and*
3. *Striving to increase the competence and prestige of the engineering profession.*

Campus Resources

As a PSU student, you have numerous resources at your disposal. Please take advantage of them while you are here. A small sample is listed below:

- MME Website: http://www.pdx.edu/mme
- Career Center: http://www.pdx.edu/careers
- Center for Student Health & Counseling: http://www.pdx.edu/shac
- The Writing Center: http://www.pdx.edu/writing-center
- PSU Disability Resource Center: 435 SMU - The PSU Disability Resource Center is available to help students with academic accommodations. If you are a student who has need for test-taking, note-taking or other assistance, please visit the DRC and notify the instructor at the beginning of the term.

Student Groups and Professional Organizations

Participation in student and professional groups can be a valuable part of your education experience. Membership gives students opportunities to get to know fellow students better, meet and network with professionals, collaborate in solving real engineering problems, learn about internship or job possibilities, socialize and have fun. Consider becoming active with a student organization, such as the following:

- American Society of Mechanical Engineers Student Group (ASCE): http://web.cecs.pdx.edu/~asme/
- Society of Automotive Engineers: Viking Motorsports: http://www.pdx.edu/mme/viking-motorsports
- Engineers without Borders: http://ewb.cecs.pdx.edu/
- Portland State Aerospace Society: http://psas.pdx.edu

Most professional organizations have monthly meetings and encourage student participation by providing discounts for lunch and dinner meetings. These meetings provide opportunities to network with potential future employers, learn about scholarships, and increase your technical knowledge. Take a look at these organizations as a starting point:

- American Society of Mechanical Engineers (ASME) Oregon Section: https://community.asme.org/oregon_section/default.aspx
- Society of Automotive Engineers, Oregon Chapter: http://www.oregonsae.org/
- Society of Women Engineers (SWE) Columbia River Section - http://columbiariver.swe.org
- Engineers without Borders, Portland Chapter: http://www.ewbportland.org/

Campus Safety

Student safety is paramount. The Campus Public Safety Office is open 24 hours a day to assist with personal safety, crime prevention and security escort services. Call 503-725-4407 for more information.

For Campus emergencies call 503-725-4404.