

Mechanical & Materials Engineering

Engineering Building, Suite 400
www.me.pdx.edu
503-725-4290



Course Number & Title	ME 493: Detailed Design Project
Credits	4
Required or Elective	Required
Prerequisite(s)	ME 492
Days/Time	Tuesday–Thursday, 12:00-1:50PM
Location	Engineering Building 102
Instructor	Dr. Gerald Recktenwald, gerry@pdx.edu, 503-725-4296
Teaching Assistant	Ryan Catabay,
Office Hours	Tuesdays, 2:30 – 4:00 PM, Thursday, 10:00 – 11:30 AM
Public Web site	http://web.cecs.pdx.edu/~gerry/class/ME493
Textbook	Fundamentals of Product Development, 4th or 5th ed., Christopher Mattson and Carl Sorenson, 2016 BYU press

Course Description:

ME 493 is the third course in the three-term Capstone sequence for BSME majors. Students work in teams to complete a major design project that was started in the preceding course, ME 492. The design project originates from a problem brought to the team by an outside sponsor or a member of the faculty. In ME 493, the team creates a final prototype of their design and they test the prototype to verify how well the design meets the client or market requirements. In some cases, the final prototype is a model or set of models that provide a detailed prediction of how the physical system designed by the team will perform when fully implemented. The team produces *design artifacts* – CAD models, part drawings, schematics, wiring diagrams, assembly instructions, measurement data and reports, photographs, videos, computer source code, computer models, physical prototypes – that they present to the instructors and the project sponsors as evidence of completion of the project. The course culminates in a public presentation by the team and a display of design artifacts in the Capstone Showcase.

Course Learning Objectives – Students must demonstrate:

ABET Student Outcomes*

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| 1. Ability to complete the detailed design of a project to meet customer requirements. | c |
| 2. Ability to apply engineering knowledge to formulate and solve design-related problems. | a, e |
| 3. Ability to use physical prototypes, direct measurements and computer simulations to verify the performance of engineering systems and subsystems. | b |
| 4. Ability to effectively communicate design concepts, decisions, client needs, system performance measures and design outcomes in writing and orally. | g |
| 5. Ability to make sustained and substantive contributions to their team in ways that help the team achieve the goals in the project contract. | d, k |
| 6. Professional and ethical conduct in all interactions with team members, project sponsors, faculty and staff of the MME Department. | f |
| 7. Ability to create a summary report describing design outcomes and artifacts from ME 492 and ME 493. | d, k |

*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 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

Design review report	15 %	One page, sign-off by sponsor
Project web page information	15 %	minimum of two submissions
Final presentation	10 %	at Capstone Showcase, June 7, 2018
Poster and public Q&A	10 %	at Capstone Showcase, June 7, 2018
Peer evaluation	20 %	via CATME
Final report	30 %	Monday, June 11, 2018

Incompletes: A grade of “I” is granted by the instructor only with prior approval and consent. Criteria are outlined in the PSU Bulletin. Poor performance in the class is not a valid reason for granting an I (incomplete).

Final Project Report:

There is no final exam. At the end of the course students submit a major report summarizing their work during ME 492 and ME 493. At the Capstone Showcase in the last week of class, the team makes a formal presentation and a separate public display of a poster describing their project. Accompanying the poster, teams display design artifacts that provide evidence of completion of the project.

Final Grade Release:

Final grades for ME 493 are based on the grading criteria listed above.

Final grades will not be released to the PSU Registrar and Student Information System until student teams complete these tasks at the end of the term:

- Return of all tools and instruments borrowed from the labs
- Clean up of lab space assigned to the team
- Submission of all digital design artifacts on CD or USB drive

The instructor will make the final decision about whether these tasks have been completed. Return of tools and instruments will be confirmed primarily with Mike Chuning, MME Faculty and staff.

Computer and E-mail Accounts

- If you haven't done so already, please go to the MCAE lab 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: www.ess.pdx.edu/osa/.

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.osbeels.org), and you should be familiar with the ASME Code of Ethics (www.asme.org/about-asme/advocacy-government-relations/ethics-in-engineering), 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: www.pdx.edu/mme
- Career Center: www.pdx.edu/advising-career-services/
- Center for Student Health & Counseling: www.pdx.edu/shac/
- The Writing Center: 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 (ASME): <http://web.cecs.pdx.edu/~asme/>
- Society of Automotive Engineers: Viking Motorsports: <http://www.pdx.edu/mme/viking-motorsports>
- Engineers without Borders: <https://www.pdx.edu/profile/engineers-without-borders>

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

Library and Literature Research

Ubiquity of the Internet makes it very tempting to think that all necessary resources for a term project will be available in full text after typing in a few words at Google.com. This is not the case. You will often need to go to the library, use library search tools and read physical books and articles contained in refereed/archival journals.

Be sure to make use of the PSU library, both physically and via the web at library.pdx.edu/. Also available on the library home page are Full Text Electronic Journals and a list of on-line Databases.

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.