

EIND 499R

Capstone: Industrial Engineering Design

Spring 2020

- Instructor:** Durward K. Sobek II, Ph.D.
253G Norm Asbjornson Hall, 994-7140, dsobek@montana.edu
Office hours: open door policy or by appointment at
<https://www.montana.edu/scheduler/login/student/?fac=6315>
- GTA:** Dimantha Kottawa, 253 Norm Asbjornson Hall, dimantha.kgs@gmail.com
- Class:** MWF 11:00-11:50 a.m., 321 Roberts Hall
- Credits:** 1 credit lecture, 1 credit laboratory, 1 credit recitation
- Course Web:** Brightspace LE (Desire2Learn, D2L): <https://ecat1.montana.edu/http://www.montana.edu/dsobek/teaching/eind499>
- Optional Text:** A technical writing resource such as: R. House, R. Layton, J. Livingston and S. Mosely, *The Engineering Communication Manual*, New York: Oxford University Press, 2017. ISBN: 9780199339105
- Prerequisites:** EGEN 310: Multidisciplinary Engineering Design
EGEN 325: Engineering Economic Analysis
EIND 434: Project and Engineering Management
EIND 442: Facility and Material Handling Systems Design
- Co-requisites:** EIND 458: Production and Engineering Management
- Catalog:** Senior capstone course. Second course in senior capstone sequence. A comprehensive open-ended team design project emphasizing the application of industrial engineering tools and knowledge to create engineered solutions for real business needs or opportunities. Oral and written communication and project management emphasized.
- Objectives:**
- Take on a substantial, open-ended problem and successfully deliver a well-engineered solution to meet a set of client needs.
 - Integrate tools and concepts from multiple industrial and management systems engineering courses and apply them to a real-world situation.
 - Improve skills in interacting professionally with clients and others.
 - Improve teamwork, interpersonal and formal communication skills.

- Apply project planning, tracking and control concepts and tools to a live project, and actively manage it.

Course Structure:

You will be assigned to work on a team to produce an engineered solution for a client's business or operational problem. Your team will be responsible for all phases of the project, including: understanding client needs and requirements, project scoping and definition, data collection, idea generation, engineering analysis, documentation, client communication, and project management. Class meetings will be used to take care of logistics, review project assignments, conduct just-in-time education on pertinent topics, and conduct project management. Full attendance and participation are expected.

Teams will apply modern project management practices in the execution of their projects. The course follows a scrum methodology, breaking the project timeline into seven "sprints." This will require teams to conduct an intensive planning session for each sprint and hold regular status meetings during the sprint to review progress and coordinate tasks. Additionally, teams will measure their project performance using earned value reporting. Teams will rotate the role of project manager so that everyone gains experience and shares the project management responsibilities. This means that the team's project management procedures must be sufficiently robust and documented to facilitate hand-offs of responsibility.

Each sprint will result in a set of deliverables: an A3-style summary report of the sprint plus the deliverables defined in that sprint's plan (i.e., a "potentially shippable" product increment, often including sections of the final written report). Deliverables will be submitted to both client and supervisor. Teams will hold sprint review meetings with their client at the conclusion of each sprint. They should expect to meet with their project supervisor at least once per sprint for expectation alignment.

Journals:

It is highly recommended that you keep an engineering notebook as a project journal. Journals are most useful when used to keep record of all project-related activities and information: class notes, meeting notes, site visit notes, brainstorming, research, sketches of design ideas, interview notes, contact information, analyses, reflections, etc. Thorough journal use presents an opportunity for a bonus of up to 5%. It also documents your contribution to the team effort which is useful for earned value reporting and other things.

Grading:

Grades will be based primarily on team performance according to the following categories:

- 35% Sprint performance (Sprint 1=10%, Sprints 2-6=5% each)
- 5% Interim presentation
- 10% Design Fair poster and team interview
- 50% Final written report (including deliverables) and Sprint 7 performance

Individual grade adjustments may be made based upon individual contribution, time and effort reports, peer evaluations and optional journal bonus.

Course Listserv:

An email listserv has been automatically created for this class. Since I will periodically post class announcements to the listserv, all students should check their primary MSU accounts regularly. If you'd like to add another email address to the listserv (perhaps one that you check more regularly), add yourself by following these instructions:

1. Send a message to sympa@sympa.montana.edu from the address you want to subscribe to the list.
2. Enter `subscribe EIND499001-sp19 firstname lastname` into the **subject field** of the message (replacing `firstname` and `lastname` with your real name).
3. Leave the message body blank.

If successful, you'll receive a message confirming your subscription to the list.

Policies:

- Follow the Lab Policies posted in Roberts Hall 415.
- Assignments are due at the specified time on the assigned due date. I do not accept late work, although exceptions may be granted for extenuating circumstances.
- The final exam time is set by the registrar's office. We will use this time to debrief on the semester. Attendance is mandatory.
- I expect each student to make full effort to attend every scheduled class meeting, advisor session, and team meeting. If you will miss a class or meeting, I expect you to exercise professionalism by notifying me and your team of the absence as far in advance as possible and taking prompt initiative to find out what you missed and make up any work as appropriate.
- If you have a documented disability for which you are or may be requesting special accommodation, please contact Disabled Student Services as soon as possible, and discuss your specific situation with the instructor.
- Because the diversity of students, faculty and staff is a resource, strength and benefit to its educational mission, MSU expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and campus events. If there are aspects of this course that create barriers to your inclusion or accurate assessment of achievement, please notify me as soon as possible so that appropriate corrective action can be taken.
- All records related to this course are confidential and will not be shared with anyone, including parents, without a signed, written release. Before giving such authorization, you should understand the purpose of the release, to whom, and for how long the information is authorized for release.
- Chronic tardiness is unprofessional and may result in you being asked to leave class. The same holds for disruptive or disrespectful behavior.

- Lying, cheating, plagiarism, or any other form of dishonesty will not be tolerated. Students who engage in such behavior will be subject to sanctions as outlined by University policy. Students should familiarize themselves with MSU Student Conduct Guidelines (see: http://www.montana.edu/policy/student_conduct/).