

1. Course number and name: SE 494/495 – Senior Engineering Project
2. Credits and contact hours: 5 Credit hours (SE 494 – 3 credits of project team grade, SE 495 – 2 credits of individual grade). Contact hours: 10 lectures, 4 presentations, weekly advisor meetings, plant visits for initial meeting, on-site presentation about week 11 or 12, and others on an “as needed” basis.
3. Instructor or course director’s name: Thomas A. Titone (Lecturer, Director) and several individual project advisors/graders from the ISE faculty and adjuncts.
4. Textbook(s) and/or other required material: No Textbook, course handbook, and other supplemental materials, e.g. lecture notes, sample reports and presentations are provided to the students electronically.
5. Specific course information
  - a. Course description: The senior engineering project provides senior engineering students with a real-world engineering project experience with an external industry partnering company in a commercial engineering environment. Each project includes a faculty advisor dedicated to the project team of three to four students. Trips to the client site are made on an as-needed basis and will vary from project to project. Each student team must work with the industry partner to understand the project description, scope of work and deliverables, and then perform an initial analysis with metrics to determine the current status of the design, product, process, or system being analyzed. A preliminary economic analysis determines the maximum budget for eventual recommendations. The project team develops solutions, along with deliverables such as drawings, prototypes, software, etc. Project team support solutions through both engineering and economic analysis, including net cash flow diagram(s), IRR, Present Worth, and simple payback period. Project teams deliver four presentations, including an on-site presentation at the industry partner site during weeks eleven or twelve. Students generate four sequential reports. A two-faculty grading committee grade the reports which include the complete final report. Students receive feedback then edit the final graded report prior to delivering the report to the industry partner as the primary project deliverable.
  - b. Prerequisites or co-requisites: SE 261, SE 290 and; SE 311, IE 300, IE 310, and TAM 335; or IE 310, IE 311, and IE Technical Elective; credit or concurrent registration in a SE Design Elective and IE Engineering Science Elective. Must enroll concurrently in SE 495.
  - c. Required or elective: Required for all SED and IE undergraduates
6. Specific goals for the course
  - a. specific outcomes of instruction:
    - Define a project scope with technical engineering and economic goals to be met [1a, 1b, 2, 4b]
    - Develop and define specifications to be achieved in a design [1a, 1b, 2, 4b]
    - Identify and use the governing equations for the engineering project [1a, 1b]
    - Work in a team to analyze, solve, develop, present, write project/problem solutions [5]
    - Communicate effectively with industry partner personnel through written & oral communication [3, 5]

- Develop, design tests and/or experiments for solution development & evaluation, [4a, 4b, 6, 7]
- Use applicable engineering standards and practices in solution development and evaluation, [2, 7]
- Develop presentations and reports to demonstrate and motivate solution adoption, supported by economic analysis, [3, 5]
- Use applicable software (CAD, FEA, CFD, simulation, etc.) in solution development, [1b, 2, 6, 7]

b. Student outcomes listed in ABET Criterion 3 and other outcomes addressed by the course:

- 1a. an ability to identify, formulate, and solve complex engineering problems
- 1b. an ability to apply principles of engineering, science, and mathematics in complex engineering problems
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
- 4a. an ability to recognize ethical and professional responsibilities in engineering situations
- 4b. an ability to make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

7. Brief list of topics to be covered: Note: due to the custom nature of each project, the items below may vary somewhat in content and duration.

- Project initiation, working with company client, communication
- Problem scoping and definition of specifications
- Development of technical presentations
- Technical writing and report structure
- Personal and organizational safety and liability with applicable standards
- Develop, compare and select engineering solutions
- Economic analysis
- Giving presentations (initial, midterm, on-site, final)
- Write reports (initial, midterm, draft final, final)
- Development of prototypes or simulations in applicable projects
- Engineering ethics, life-long learning, engineering standards

8. Grade determination:

All grades are 90% of stated items in 8.a. and 8.b with 10% discerned by course director's overall assessment of student's class participation, peer evaluation, advisor feedback, grader feedback and industry partner feedback.

- a. SE 494 grades are determined by a grading committee of two faculty who review four reports and four presentations during the semester and give feedback to the student team. The fourth and final report is assigned a letter grade by the grading committee which becomes the course grade shared by all team members who **significantly** contribute to the project deliverables, otherwise one or more students may receive a different grade or an incomplete for the course.
- b. SE 495 grades are individual grades to each team member and are assigned by the project advisor with regard to student attendance, participation, peer evaluations, responsiveness, professionalism etc.
- c. Academic Honesty: Plagiarism or the use of artificial intelligence such as ChatGPT will constitute grounds of University Sanctions including immediate failure in course for reason of academic dishonesty; see <https://studentcode.illinois.edu/article1/part4/1-402/>

## Course Calendar

### Spring 2024 Semester Calendar

**Legend: Blue Lecture, Green Assignment, Orange Advisor or Grader Actions, Red Company Involvement**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Jan 14 - 1 -	Jan 15 Instruction Begins	Jan 16 *9:00 am Lecture - Attendance Required ADVISOR & Student Project Vote by Noon	Jan 17	Jan 18 *9:00 – 10:30am - Attendance Required Call Company to Schedule Site Visit	Jan 19 Upload Combined Schedules to Canvas	Jan 20
Jan 21 - 2 -	Jan 22	Jan 23	Jan 24	Jan 25	Jan 26	Jan 27
----- All Groups & Advisors travel to Companies during this week -----						
Jan 28 - 3 -	Jan 29	Jan 30 *10:00 am Lecture Abstract Assignment	Jan 31 Company contacts, team photo, plant visit checklist to Canvas, Schedule meeting with Dr Titone	Feb 1 *10:00 am Lecture Abstract Feedback	Feb 2 Company Feedback	Feb 3
Feb 4 - 4 -	Feb 5	Feb 6 *10:00 am Lecture	Feb 7	Feb 8 *10:00 am Lecture	Feb 9	Feb 10
Feb 11 - 5 -	Feb 12	Feb 13 *10:00 am Lecture	Feb 14	Feb 15 9:00 am Presentation #1 (GRADER)	Feb 16 Pre-Report & signed P.D. to Canvas & Box (GRADER)	Feb 17
Feb 18 - 6 -	Feb 19	Feb 20 *10:00 AM Lecture GRADER Pre-Report Feedback	Feb 21	Feb 22	Feb 23 Company Feedback	Feb 24
Feb 25 - 7 -	Feb 26	Feb 27 *10:00 am Lecture	Feb 28	Feb 29 Outline & Midterm Draft to Advisor (ADVISOR)	Mar 1	Mar 2
Mar 3 - 8 -	Mar 4	Mar 5 *10:00 AM Lecture ADVISOR Midterm Feedback Due	Mar 6 EOH Poster DUE	Mar 7 Midterm to Canvas & Box Colleague Eval Form to Advisor (GRADER)	Mar 8	Mar 9
Mar 10 - 9 -	Mar 11	Mar 12	Mar 13	Mar 14	Mar 15	Mar 16
----- !!!!!!!!!!!!!!!SPRING BREAK!!!!!!!!!!!!!! -----						
Mar 17 - 10 -	Mar 18	Mar 19 *10:00 AM Lecture GRADER Midterm Feedback Due	Mar 20	Mar 21 Revised Midterm to Canvas and Company	Mar 22 Company Feedback EOH Poster Vote Due	Mar 23
Mar 24 - 11 -	Mar 25	Mar 26 *10:00 am Lecture	Mar 27	Mar 28 Presentation #2 (GRADER)	Mar 29	Mar 30
Mar 31 - 12 -	Apr 1	Apr 2	Apr 3	Apr 4	Apr 5	Apr 6
----- All Groups give Presentations at Companies during this week -----						
Apr 7 - 13 -	Apr 8	Apr 9 *10:00 am Lecture - Attendance Required at Ethics Lecture	Apr 10	Apr 11 Draft Report to Advisor (ADVISOR)	Apr 12 Company Feedback	Apr 13
Apr 14 - 14 -	Apr 15	Apr 16 *10:00 AM Lecture - Attendance Required at Ethics Lecture ADVISOR Draft Feedback Due	Apr 17	Apr 18 Draft to Canvas & Box (GRADER)	Apr 19 Invite Company to Final Presentation	Apr 20
Apr 21 - 15 -	Apr 22	Apr 23 *10:00 am Lecture GRADER Draft Feedback Due	Apr 24	Apr 25	Apr 26 Capstone Competition Submission Deadline	Apr 27
Apr 28 - 16 -	Apr 29	Apr 30 No Lecture	May 1 Final Report Due to Canvas & Box	May 2 Reading Day	May 3	May 4
May 5 - 17 -	May 6	May 7	May 8 GRADER Final Report Feedback Due	May 9 Final Graded Reports, Exit Procedures, all deliverables per Checklist	May 10 Final Presentations & Reception with Advisors and Company 8:00am-1:00pm	May 11 GRADER ADVISOR student and project grades due