

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. explicitly indicate which of the student outcomes listed in ABET Criterion 3 or any other outcomes are 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:
- c. 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.

- d. 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, etc.

Course Calendar – **SPRING 2022**

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