

# Interdisciplinary Experiential Senior Design I

## ENGR 4490 – Fall 2020

### Instructor

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**Office Hours:** TWR 11:00-12:00 or by appointment

### Course Description

#### Catalog Description

This is the first in a two-course sequence culminating the undergraduate engineering education. Under the guidance of a faculty mentor and an industry partner mentor, students form small interdisciplinary teams to apply engineering design principles and methods for solving and industry-relevant engineering design problem. This first course in the sequence also covers topics including the engineering ethics, the Fundamentals of Engineering exam, and professional engineering organizations.

#### Course Details

Term: Fall 2020

Course name: Interdisciplinary Experiential Senior Design I

Course number: ENGR 4490

Section number(s): 01

Meeting times: 2:00-2:50 pm Thursdays (one meeting F2F, one meeting remote)

Room number: Q 311

#### Learning Outcomes

By the end of this course, students will

- Be informed on professional organizations such as IEEE, ASME, ASCE, ASEE, GSPE, etc.
- Be informed on the professional licensure process (FE and PE)
- Demonstrate an understanding of professional and ethical responsibility as it pertains to an engineering code of ethics such as NCEES or ASME
- Develop a mathematical or physical model.
- Apply a specific learning method or process to address and solve an engineering problem
- Demonstrate the ability to independently learn a technical subject through self-study
- Use engineering judgement to draw conclusions or predictions based on appropriate analysis and interpretation of data collected from an experiment
- Formulate a problem statement that clearly describes the need for the design
- Develop project specifications considering multiple realistic constraints (such as accessibility, aesthetics, codes, constructability, cost, ergonomics, extensibility, functionality, interoperability, legal considerations, maintainability, manufacturability, marketability, policy, regulations, schedule, standards, sustainability, or usability)

#### Textbook

Recommended: *Engineering Design*, Rudolph J. Eggert, High Peak Press, ISBN 978-0-615-31938-4

<https://www.abebooks.com/Engineering-Design-Second-Edition-Rudolph-Eggert/30353497351/bd>



## Course Delivery Mode and Attendance

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The course is delivered in a blended model where one meeting per week is conducted in person, and the second meeting is conducted remotely, either online or on site with the industry partner. Each of the remote meetings will require a deliverable as part of the weekly tasks category (see below). Students are expected to attend all in person meetings.

## Description of Stakeholder Roles

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An important component of this course is managing a project involving various stakeholders who serve in different roles. Attention should be paid to understanding these roles and facilitating communication between everyone involved. The stakeholders in this course and their roles are summarized below.

- Instructor: the instructor of record for the course responsible for delivering and evaluating the academic content in the course.
- KSU team: the subset of students in the course working on one of the course projects. Team members are responsible for carrying out the actual work on the project in coordination with the instructor, faculty mentor, and partner team.
- Partner team: an individual or group at the industry partner serving as the customer for the project. The partner team will provide guidance on the project requirements and offer technical mentoring where appropriate.
- Faculty mentor: a KSU faculty member serving as a liaison between the KSU and partner teams responsible for ensuring communication between the two teams flows smoothly.

## Course Communication

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Course material will be disseminated in D2L. All official course announcements, including instructions when class may be cancelled, will be posted in the D2L course news. Be sure to check D2L regularly.

## Grading Policy

Item	Fraction
Weekly tasks	55%
System Requirements Review	15%
System Concept Review	15%
Subsystem demonstration/design	15%
<b>Total</b>	<b>100%</b>

**Grade Conversion:** A: (90-100), B: (80-89), C: (70-79), D: (60-69), F: (0-59)

## Weekly Tasks

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On Friday of each week, the deliverable associated with the remote learning meeting will be due. Examples of these tasks include reflections, quizzes, short reports, etc. Details of the weekly tasks and their grading rubrics can be found on D2L.

## System Requirements Review (SRR)

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The SRR is a formal review conducted to sufficiently detail and understand system requirements to enable system function definition, functional decomposition, test, and evaluation. The SRR will include a formulation of the problem statement, identification of project constraints and the industrial standards relevant for the design.

## System Concept Review (SCR)

The SCR aims to select a preferred concept that has the potential to satisfy project requirements. The emphasis should be on the proposed design concept, system functionality, and the definition of major system interfaces. The review will present the major design alternatives considered, the relative risk for each, and the reasons for the approach chosen by the design team. The output from the SCR is a baseline for the detailed design.

## Subsystem Model Demonstration

Each team will identify a subsystem of the project to explore during the initial phase of design. Ideally, a more challenging subsystem with associated high risk or unknown behavior should be selected, for which an in-depth analysis could inform the preliminary design. The team will develop either a mathematical or physical model of the subsystem, and identify a process to analyze performance of the subsystem. The form of the demonstration will be appropriate for the specific subsystem selected, and could involve a physical prototype, simulation, computer aided engineering model, or similar approach. In any case, the demonstration will include an analysis of collected data.

## Course Outline

Activities marked **in red** require communication with the industry partner. Industry partners will be invited to participate in activities marked **in blue**.

Date	Lecture
Aug 20	Introduction
Remote	<b>Organize kick off meeting with industry partner</b>
Aug 27	Engineering standards
Remote	<b>Identify appropriate standards in collaboration with industry partner</b>
Sep 03	Project lifecycles
Remote	<b>Identify typical project lifecycle at industry partner</b>
Sep 10	Formulating a design problem
Remote	Develop plan for project lifecycle
Sep 17	Concept design
Remote	House of Quality for project
Sep 24	<b>System Requirements Review</b>
Remote	<b>Conduct requirements review meeting with industry partner</b>
Oct 01	Safety training
Remote	Component and function decomposition of the project
Oct 08	Ethics
Remote	<b>Identify safety measures appropriate for industry partner workspace</b>
Oct 15	Physical and mathematical models
Remote	Ethics case study
Oct 22	<b>System Concept Review</b>
Remote	<b>Conduct concept review meeting with industry partner</b>
Oct 29	FE exam
Remote	Identify subsystem to be modeled
Nov 05	FE exam questions
Remote	Discussion on FE exam
Nov 12	Professional organizations
Remote	Mock FE exam
Nov 19	Planning for next semester
Remote	Discussion on career relevance of professional organizations
Remote	<b>Subsystem model demonstration</b>
Remote	<b>Solicit feedback on demonstration from industry partner</b>

## COVID-19 Safety Precautions

### Face Masks in the classroom

As mandated by the University System of Georgia, the university requires the use of face masks in the classroom and in KSU buildings to protect you, your classmates, and instructors. Per the University System of Georgia, anyone not using a face covering when required will be asked to wear one or must leave the area. Repeated refusal to comply with the requirement may result in discipline through the applicable conduct code.

Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons. Please contact Student Disability Services at [sds@kennesaw.edu](mailto:sds@kennesaw.edu) for student accommodation requests.

### Shifting Modalities

Please note that the university reserves the right to shift teaching modalities at any time during the semester, if health and safety guidelines require it to do so. Some teaching modalities that may be used are F2F, Hyflex, Hybrid, or online, both synchronous and asynchronous instruction.

### Staying Home When Sick

If you are ill, please stay home and contact your health professional. In that case, please email the instructor to say you are missing class due to illness. Signs of illness include, but are not limited to, the following:

- Cough
- Fever of 100.4 or higher
- Runny nose or new sinus congestion
- Shortness of breath or difficulty breathing
- Chills
- Sore Throat
- New loss of taste and/or smell

## Institutional Policies

*Information contained in the link below constitutes the Federal, BOR, and KSU course syllabus policies. These policies are updated on the Academic Affairs website annually.*

[Federal, BOR, & KSU Course Syllabus Policies](#)

## KSU Student Resources

*This link contains information on help and resources available to students:*

[KSU Student Syllabus Resources](#)