ISYE 3106 Syllabus

Cornerstone Design for Industrial Engineers, 3.00 Credits
Spring 2026

Section A: Mondays and Wednesdays 3:30 PM – 4:45 PM, Environmental Sci & Tech L1175

Instructor	**Email**	**Office Hours**
Dr. Gamze Tokol-Goldsman	gtg3@isye.gatech.edu Office: Groseclose 213A	Mon & Wed: 2:00 PM – 3:00 PM; or by appointment
Teaching Assistant	**Email**	**Office Hours (ISyE Studio or online)**
Chaitanya Sri "Rinky" Yetukuri	csyetukuri@gatech.edu	Tue & Thu: 9:00 AM – 10:00 AM or by appointment

General Information

Description

This course introduces students to problems in Industrial and Systems Engineering through project-based learning utilizing past Senior Design projects. Emphasis is on identifying and specifying the opportunities for improving a system through diagnostic data analysis, scoping a solution strategy, and writing/presenting a proposal for addressing the client's needs. In addition, students will receive guidance to help develop their professional skills in communication, professionalism, and teamwork.

Degree Requirement**:** Counts as an ISYE Breadth Elective

Cannot be taken concurrently with or after completing Senior Design (ISYE 4106)

Pre- &/or Co-Requisites

Pre-requisite: ISYE 3030 with concurrency

Course Goals and Learning Outcomes

Upon successful completion of this course, you should be able to:

- Identify, break down, and define a problem/opportunity statement for an industrial engineering design project
- Practice the information and data collection process to define the problem, understand the context, and identify the opportunities
- Develop the essential components of writing and presenting a business/ Industrial Engineering design proposal
- Be effective in a collaborative and inclusive team to meet objectives
- Learn to provide feedback
- Write and present a proposal for solving problems addressed with Industrial Engineering methodologies

Course Materials

No textbook is assigned; we will use a series of readings and Senior Design cases.
Canvas and MS Teams are the mandatory communication tools in this class. All class-related materials are posted there. Students are responsible for all announcements and changes in the schedule that are made in class, posted on MS Teams, Canvas or sent via email.

Course Requirements & Grading

Please see the Tentative Course Plan for the details of the assignments. Also see http://registrar.gatech.edu/info/grading-system for more information about the grading system at Georgia Tech.

Assignment	Weight
Attendance	10%
Participation in class work	10%
Individual Mini Assignments	10%
Cost vs. Service Study Project	20%
Design Challenge Project	Total 15%
Frame-the-Design-Problem Project	Total 25%
Team pod	Total 10%
Total	100% + Extra Credits

[1] Undergraduate Research students who substituted LMC 4701 and LMC 4702 by ISyE 3106 need to see the instructor by the second week to determine their requirements to fulfill the research thesis.

Determination of Grades

Georgia Tech has recently provided guidance that students should be able to easily translate their scores on assignments, tests, and projects to their course letter grade. To this end, we have the following conversion table.

Grade*	Criteria
A	90 – 100%
B	80 – 89%
C	70 – 79%
D	60 – 69%
F	below 60%

* Note that we may relax the above criteria if we feel that mercy is appropriate.

Description of Graded Components

Attendance and Participation

Attendance is expected unless there is an excused absence. If you miss a class due to a reasonable excuse, tell me in advance and **copy the TA**. Excused absences will not negatively impact your attendance grade. **If you are sick or have symptoms of an infectious disease, you should not attend class.**

Class participation is a very important part of the learning process in this course. Your participation grade will be based on the quality of your contributions and insights. Participation includes interactions in class, on Canvas or MS Teams discussions, interactions during workshops, interactions with your teammates (assessed by the peer evaluations), interactions during presentations, and completing class participation exercises. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments.

While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Mini-assignments and samples of past pre-proposals analysis

Students are required to complete assignments based on in-class exercises involving analysis of past preliminary proposals submitted in senior design and concepts introduced in class on capacity, variability, etc. These will be individual submissions. Announcements about the submission format will be made in class and on Canvas. Make sure that your Canvas setting alerts/notifies you when new materials are posted. There will be some **extra credit** opportunities.

Team Formation:

Students are allowed to form their teams. In order to form complete teams, a survey will be conducted asking for teammate preferences and schedule constraints. We will announce the teams the second week of classes. Team membership does not change throughout the semester unless there are extenuating circumstances. If you plan to withdraw from the course, it is important that you tell your instructor and teammates as soon as you have decided to do so. This is a project-team-based course, and your decisions impact the performance of your teammates.

Cost vs. Service Study Project

Each project team will complete a project to investigate the relationship between service (measured using customer cycle time) and cost (measured using resource utilization). It's obvious that there is a direct relationship between the number of resources in a system and their cost. It's not obvious, however, the relationship between service (e.g., waiting time for customers) and the number of resources. This project aims to get students to identify the data they need to quantify those relationships for a queueing system, collect that data, analyze it, and identify potential opportunities in that system to improve service without increasing resources.

Design Challenge Project

Teams will play the role of consultants called in to suggest how a hypothetical system should redesign/change its operations to accommodate customer service. Each team will complete the design challenge project in three stages: i. Client description, ii. Business problem, and iii. System design problem and presentation. Teams may also practice data collection. Each team will submit a short report in each stage, and will present in stage three. More information will be provided later. This project aims to get students to describe the system, and identify the objectives, processes, required resources, constraints, potential opportunities, and other design components.

Frame-the-Design-Problem (Final) Project

This is the third and the final project and is based on a past senior design project. Your assignment has two stages: i. Developing and writing a preliminary proposal and ii. Presentation (each team will both present and play client role). The system to be studied and the required data for this project will be provided and discussed during the semester.

You are expected to articulate what the project goal should be, why this project is important to the business/organization, what opportunities you have identified for achieving the goal, what data analysis you conducted to identify the system design opportunities, what data you would need for your design strategy (solution), and what value you bring to the client by redesigning this system.

Team Pod

Each team will assume a manager role and assess other teams' written and presentation performances. Team pod activities will take place after *Design the Challenge - Part 3* and after the *Frame-the-Design (Final)* project. Additional details will be shared later.

Peer Evaluations

Students are required to provide evaluations after each project: evaluations of team members' contributions. This input will be used in addition to the instructor's opinions when determining grade adjustments and/or reductions to a project grade. Failing to complete the peer evaluation survey results in a significant **grade penalty applied to the missed evaluation**. The penalty for insufficient contribution ranges from 10% to 100% of the project weight.

Late submissions of an assignment will have a penalty ranging from 10% to 100% deduction on that assignment depending on the lateness. Time to complete an assignment will be more than sufficient. Assignments submitted 24 hours or more late will not be accepted.

Incomplete Grade: An "I" will be granted only if a passing grade has been maintained, 70% of the course work is completed, and there is a documented family or medical emergency through the Dean of Students.

Course Expectations & Guidelines

Academic Integrity

Academic dishonesty will not be tolerated in this course. Any assistance on an assignment or a project from any source, besides yourself, must be included in your report.

The Georgia Tech Honor Code will be strictly enforced in this class. It is each student's responsibility to understand and abide by the Honor Code as it applies to each class activity.

Failure to adhere to any of these requirements constitutes a violation of the Honor Code; other situations are also at the discretion of the instructor.

To protect the honest majority, any cheating, big or small, will be penalized by an "F" in the assignment/project in which the incident happened, and the student will be referred to the Dean of Student Affairs for disciplinary action. If there is any question as to whether an activity is or is not permissible (in this class) under the Honor Code, consult the instructor prior to undertaking the activity.

Non-Discrimination

This class does not discriminate on any basis such as race, color, age, religion, national origin, sexual orientation, gender, marital status, social class, or disability.

Artificial Intelligence Use:

Generative AI tools are now becoming a more integral part of how we derive knowledge, how companies do business, and what employment opportunities are available. However, they are a two-edged sword. While they provide opportunities for learning, they can also hamper self-learning if that new knowledge and learned concepts are not solidified for understanding, replication, and rigorous analysis. Such tools may also interfere with the development of accurate knowledge since **such tools tend to make up an answer if they don't know the answer.**

In our course, the use of Generative AI tools should be considered a parallel to collaboration with other people: you are welcome to talk about your work with other peers/students as well as with AI-based

assistants. However, **all work you submit must be your own**. You should **never include** in your work anything that was not written or computed or modeled directly by you without proper reference.

Generative AI tools could be useful in your project as follows:

- Inquiries about (basic) concepts, public information, media, references including methods, etc. You will have to thread this carefully since the information provided by such tools may not be accurate/correct/rigorous. Do not use these tools as your only approach to complement learning.
- Inquiries about the use of computer codes and implementations without using actual project data. AI tools may provide additional support that could improve your use of methods, for example, better ways to develop visual analytics, or use of computer code in a more efficient way.
- To check the grammar of sentences from your reports (as long as those sentences are yours).

You are **NOT allowed** to use Generative AI

- To generate text for your report.
- To generate slides for your presentations.
- To generate a script for your presentations.

In other words, ***do not let AI*** *do your* ***thinking and writing for you****.*

It is **your responsibility** to follow all applicable rules and to recognize that information generated by AI tools may not always be accurate. As a result, you must verify such information with your advisor, client, team, and/or other reliable resources.

Students should be aware of the potential **harm to their learning** that may arise from improper AI use. *Submitting any part or the entirety of a project using AI tools in a manner that does not comply with Georgia Tech policies will be considered an* ***Honor Code violation****.*

Please read carefully **the Georgia Tech Guidelines**:

https://gatech.service-now.com/home?id=kb_article_view&sysparm_article=KB0043472

Please read about **some heuristics** and recommendations at: https://www.cc.gatech.edu/news/new-policies-navigate-role-ai-assistants-cs-courses.

Accommodation for Students

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404) 894-2563 or http://disabilityservices.gatech.edu as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodation letter.

For any help (student engagement and well-being) see the site: https://students.gatech.edu/ and/or https://mentalhealth.gatech.edu/.

Special Circumstances

In some cases, religious observances or other events may conflict with scheduled class activities. *In such situations students can be given an alternative means of meeting the academic requirement.* **Students must notify the instructor of any such conflicts, with the specific dates, within the first two weeks of classes.** Students requiring disability accommodation are also requested to make arrangements with the instructor within the same period if possible.

Collaboration & Group Work

For the individual assignments, each student is expected to turn in their own individual work. No copying from other students, from the internet, or from any other source is allowed. You may form study groups to prepare prior to an assignment deadline. For projects, students will work in small groups. Each group is expected to turn in only one report. If you have questions about the collaboration policy, ask us.

Student-Faculty Expectations Agreement

At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of some basic expectation that you can have of us and that we have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

Tentative Course Schedule

Note: The instructor reserves the right to modify the course content, sequence of topics, and course assignments during the progress of the course.

Week	**Class**	**TOPIC**	***Notes***
1 Jan 12-16	1	Course, instructor, student introductions. Introducing discrete event logistics systems; Examples	Teams are formed as soon as registration ends; TA will have a preference form that must be completed by 1/17
	2	Semantics, Examples; Past Senior Design projects	
2 Jan 19-23	**X**	***MLK Day***	Teams are formed; *SD Finalists assignment due 1/26* ***Cost vs Service Study Project Assigned***
	3	Design vs. Analysis; Engineering design process Discussion of the cost vs service project and expectations;	
3 Jan 26-30	4	Design vs. Analysis; Teamwork principles	*Assignment 1 (individual) due Monday.*
	5	**Problem/Opportunity statement** elements and structure; Using a past senior design project in-class exercise; In-class project work	
4 Feb 2-6	6	Key IE flow lines concept: Capacity, utilization, throughput; Demonstrating through a Sr D (GT Game Day) project	
	7	In-class work	
5 Feb 9-13	8	***Cost vs Service Project presentations***	***Cost vs Service Project Due*** ***Design Challenge Project Assigned***

Week	**Class**	**TOPIC**	***Notes***
Happy Valentine's Day! ❤️	9	Understanding and describing an IE system; The structure of an ISYE design preliminary proposal;	*Capacity/Utilization assignment due Friday (individual)*
6 Feb 16-20	10	Key IE flow lines concept: Variability principles; Demonstrating through a SD (GT Game Day) project and Assignment data	***Design Challenge 1 Due***
	11	The structure of an ISyE design preliminary proposal In-class project work session	
7 Feb 23-27	12	The structure of an ISyE design preliminary proposal; In-class project work session	***Design Challenge 2 Due*** *Variability assignment due Wednesday (individual)*
	13	***Presentation workshop with Dr. Brandy Blake***	
8 Mar 2-6	14	Gathering information; RFLP Methodology In-class project work session	
	15	***Workshop with Moe Trebuchon***	
9 Mar 9-13	16	***Design Challenge project presentations/team pod***	***Design Challenge 3 Due*** (report and presentation)
	17		
10 Mar 16-20	18	Proposal presentation and Final presentation samples; Pre-proposal critique; In-class project work session	
	19	***Writing workshop with Dr. Brandy Blake***	
11 Mar 23-27	**X**	***Spring Break***	
	X		
12 Mar 30- Apr 3	20	In-class project work session; The structure of an ISyE design preliminary proposal;	*Pre-proposal critique assignment (individual) due Friday* ***Final Project Assigned*** *Data request due Fri*
	21	Meeting with Dr. Blake during week 12 or 13	
13 Apr 6-10	22	In-class project work sessions Meeting with Dr. Blake during week 12 or 13	
	23	1-1 feedback session	
14 Apr 13-17	24	1-1 feedback session	
	25		
15 Apr 20-24	26	***Proposal presentations/team pod***	***Pre-Proposal slides and script due Monday*** *Final Project/**Preliminary Proposal Report due Friday***
	27		
16 Apr 27	28	Wrap up	*Team pod due Monday*