ISYE 3106 Syllabus

Cornerstone Design for Industrial Engineers, 3.00 Credits
Fall 2023

Section NAZ: Mondays and Wednesdays 3:30 PM – 4:45 PM, TBD

Cornerstone Design Team: Dr. Dima Nazzal, Dr. Leon McGinnis, Dr. Gamze Tokol-Goldsman

Instructor	Email	Office Hours
Dr. Dima Nazzal	dima.nazzal@gatech.edu Office: Groseclose 213	Mon & Wed: 11:00 am – 12:00 pm; Or by appointment
Teaching Assistant	**Email**	**Office Hours (ISyE Studio or online)**
TBD	TBD	TBD

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 need. 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 and ISYE 3133 with concurrency

Course Goals and Learning Outcomes

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

- Identify, breakdown, and define a problem/opportunity statement for an IE project
- Practice the data collection process
- Develop the essential components of writing a business/ Industrial Engineering proposal
- Be effective in a collaborative and inclusive team to meet objectives
- Write and present a proposal for solving problems addressed with Industrial Engineering methodologies

Course Requirements & Grading

Assignment	Weight
Attendance and Participation	10%
Individual mini-assignments and past pre-proposals analysis	20%
Design Challenge Project – Team based	Total 40%
- Part 1 (Client description): 5%	
- Part 2 (Business problem report and presentation): 15%	
- Part 3 (System design problem report and presentation): 20%	
Frame-the-Design-Problem Project – Team based	Total 30%
- Part 1 (Preliminary proposal report): 15%	
- Part 2 (Full proposal presentation): 15%	

[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.

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.

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 us in advance and copy the TA. Excused absences will not negatively impact your attendance grade.

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 Dr. Blake's workshops, interactions with your teammates (assessed by the peer evaluations), and interactions during presentations. 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.

Even though class attendance helps to interact more and better engagement, we'll make every effort to record the lectures for students who miss them or who want to review later. If you are sick or have symptoms of an infectious disease, you should not attend class. Nevertheless, if you have a reason for an absence, please email to your TA and the instructor.

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 on 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.

Design Challenge Project

Teams will play the role of consultants called in to suggest how a hypothetical conventional business should redesign its operations to accommodate customer service. Each team will complete the design challenge project in three stages: i. Hypothetical client description, ii. Business problem report and presentation, and iii. System design problem and presentation. Teams will also practice data collection. Each team will submit a short report in each stage, and will present in stages two and 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 Project

This is the second and the final project and is based on a past recent senior design project. Your assignment has two stages: i. Developing and writing a preliminary proposal and ii. Presenting a full proposal. 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.

Peer Evaluations

Students are required to provide two evaluations after each project: evaluations of team members' contributions and evaluations of other presenting teams. 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 significant <u>grade penalty applied to the missed evaluation</u>. 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.

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

Team Assignments:

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. The TA will announce team formation 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.

Course Materials

No textbook is assigned; we will use a series of readings and 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 Expectations & Guidelines

Academic Integrity

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

The Georgia Tech <u>Honor Code</u> will be strictly enforced in this class. It is each student's responsibility to understand and abide by the <u>Honor Code</u> 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 <u>Honor Code</u>, 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, or disability. Racist, sexist, homophobic, classist, or any discriminatory attitudes toward others will not be tolerated.

Accommodations 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 accommodations letter. Please also e-mail us as soon as possible in order to set up a time to discuss your learning needs.

Also, please see the links, "Well-Being Connect" and "Mental Health Resources" on Canvas page.

Other Georgia Tech Support Resources

- The Office of the Dean of Students: http://studentlife.gatech.edu/content/services; **404-894-6367**; Smithgall Student Services Building 2nd floor; https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?

- Counseling Center: http://counseling.gatech.edu; **404-894-2575**; Smithgall Student Services Building 2nd floor. (Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.)
- Information related to Covid-19: https://health.gatech.edu/tech-moving-forward
- Care center: https://care.gatech.edu/
- Students' Temporary Assistance and Resources (STAR): http://studentlife.gatech.edu/content/need-help
- Stamps Health Services: https://health.gatech.edu; **404-894-1420**
- OMED: Educational Services: http://www.omed.gatech.edu
- Women's Resource Center: http://www.womenscenter.gatech.edu; **404-385-0230**
- LGBTQIA Resource Center: http://lgbtqia.gatech.edu/; **404-385-2679**
- Georgia Tech Police: **404-894-2500**

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 Aug 21-25	1	Course, instructor, students introduction. Introduce discrete event logistics systems; Examples	Teams are formed as soon as registration ends; TA will have a preference form that must be completed by Friday
	2	Semantics, Examples; Past Senior Design projects	
2 Aug 28- Sept 1	3	Design vs. Analysis; Engineering design process	Teams are formed Design Challenge Project Assigned
	4	Engineering design process; Teamwork principles Discussion of the Design Challenge project and expectations	
3 Sept 4-8	X	Labor Day	*Design Challenge Assignment 1* (hypothetical client description) Due by Friday
	5	**Problem/Opportunity statement** elements and structure: Motivation, Goal, Opportunities and Design Variables *Using a past senior design project to construct a logical problem statement (interactive session)*	

Week	Class	TOPIC	Notes
4 Sept 11-15	6	The RFLP Design Methodology Discuss the pre-proposal template for Senior Design; **Pre-proposal analysis/critique** using past Senior Design examples: Active learning session	*Problem/Opportunity statement mini assignment (team)*
	7	Team work session on system design phase *for design challenge project*	
5 Sept 18-22	8	Understanding and describing an IE system. Gathering information with example from a senior design project.	*Pre-proposal critique assignment (individual) due* ***Design Challenge Assignment 2*** (Business problem report and presentation) Due by Wed
	9	Design challenge business problem ***presentations***	
6 Sept 25-29	10	Lesson on system design using a senior design past project: **Describing system design requirements and constraints**	
	11	***Writing workshop with Dr. Brandy Blake***	
7 Oct 2-6	12	In-class design challenge project work session	***Design Challenge Assignment 3*** (system design problem report and presentation) Due by Wed
	13	Design challenge system design ***presentations***	
8 Oct 9-13	14	Lesson on system design using a senior design past project: **Describing resource and process and control**	***Project 2 assigned*** *Frame-the-Design-Problem* Project Assigned
	15	Key IE concept: Capacity, utilization, throughput; integrated into the system design framework. Why these concepts are important. Demonstrating through a senior design project	
9 Oct 16-20	X	Fall break	
	16	Project information gathering/data inquiries	
10 Oct 23-27	17	In-class project work session	*Capacity/utilization assignment (individual) due*
	18	Key flow lines variability principles integrated into the system design framework. Why these principles are important. Demonstrating through a senior design project	
11 Oct 30-Nov 3	19	In-class project work sessions	
12 Nov 6-10	20	Estimating value	*Variability Effects Exercises due (individual)*
	21	***Presentation workshop with Dr. Brandy Blake***	
13 Nov 13-17	22	All stages of a Senior Design project	*"Frame-the-design problem" Assignment 1/**Preliminary Proposals Due***
	23	In-class project work sessions	
14 Nov 20-24	24	1-1 feedback session between instructor and each team to discuss their pre-proposals	
	X	Thanksgiving	
15 Nov 27-Dec 1	25	Proposal Presentations	*"Frame-the-design problem" Assignment 2/**Full Proposal Presentations Due***
	26		

Week	Class	TOPIC	Notes
16 Dec 4 - 8	27	Review of Key Learnings	