ISyE 4106 Senior Design Syllabus[1]

Spring 2027

CREDIT
0-12-4, no lectures, 12 practicum hours and 4 credits.

INSTRUCTORS (Faculty Examiners)
Dr. David Goldsman (sman@gatech.edu)
Dr. Laura Li (laura.li@gatech.edu)
Dr. Gamze Tokol-Goldsman (gamze.tokol-goldsman@isye.gatech.edu)

PREREQUISITES
ISYE 3025, ISYE 3133, ISYE 3232, ISYE 3044, ISYE 4031, 3 concentration electives and successful completion of ISYE 4800.

DESCRIPTION
Senior design project requiring student team working with an off-campus enterprise to define a system design or operational problem, propose a solution and assess the solution's impact.

PROJECT REQUIREMENTS
Senior Design projects must meet four criteria: Engineering Design, Industrial Engineering Methodology, Magnitude, and Value. Please refer to the Senior Design Manual for details. In addition to completing a project that meets these requirements, you are required to present your results in oral and written form, and to act in a professional manner toward the faculty, the client company, and your fellow students at all times throughout the process.

COURSE LEARNING OUTCOMES
In Senior Design, you seek opportunities for improvement in a setting appropriate for Industrial Engineering professional practice and learn how Industrial Engineering methods and tools can impact the bigger organizational picture. You will learn:

(1) how to properly define and scope a problem;

(2) to identify and analyze relevant factors;

(3) To apply methodologies studied in the curriculum in a cumulative and comprehensive manner to model and solve engineering design problems quantitatively and computationally to produce solutions that incorporate **appropriate engineering standards under multiple constraints** with consideration for public health, safety, and welfare, as well as ethical, professional, global, cultural, social, environmental, and economic factors.

(4) to improve your skills and knowledge in important related areas:

- writing and presenting engineering reports in technical and non-technical settings,
- working within a team and an organization,
- project and time management,
- workplace professionalism, and
- legal issues, confidentiality, and intellectual property.

The vehicle for this learning is an intensive, semester-long, team-based engineering design project.

REQUIRED COURSE MATERIALS
"Senior Design Manual", by Blake, Hackman, Li, McGinnis, Nazzal, Sokol, Tokol-Goldsman, and Zhou. Available on the Canvas course website. You are responsible for knowing the contents in the manual. Before you ask, please check.

In addition, the following 69-page book provides concrete meanings to many aspects of professionalism, as well as to be a good engineer. It is a useful reference.
"Unwritten Laws of Engineering: Revised and Updated Edition" by King, W. J. and Skakoon, J. G. Publisher: American Society of Mechanical Engineers; Revised edition (June 1, 2001).

---

[1] This syllabus may be revised at any time. Revisions will be announced.

ORGANIZATION & RESOURCES

ISyE provides resources to enable your success. These are summarized on the table below. The two roles that have the most interactions with your teams are the Examiner, who applies the grading rubric and assigns grades, and the Advisor, who works with your team on a day-to-day basis.

Resource	*Area(s) of Assistance in ISYE 4106*	*Notes*
Faculty Examiners Dr. David Goldsman sman@gatech.edu Dr. Laura Li laura.li@gatech.edu Dr. Gamze Tokol-Goldsman gamze.tokol-goldsman@isye.gatech.edu Dr. Kamran Paynabar (Create-X teams) Kamran.paynabar@isye.gatech.edu	Responsible for syllabus, information sessions, presentation (faculty version) schedules; evaluating interim and final reports and presentations based on the published rubric; assigning ISYE 4106 grades with feedback from advisors.	To maintain impartiality in grading, the Senior Design examiners are not eligible to advise teams on their project once they are assigned a faculty advisor.
Faculty Advisors (The team/advisor/examiner assignment will be announced in a separate document)	Interact with their teams weekly to provide coaching on how to define projects and develop solutions; help with professionalism, communications; and links team with other resources.	Faculty advisors do not assign grades but provide input to examiners on their team's work ethics and professionalism.
Associate Chair for Academic Administration Dr. Dima Nazzal dima.nazzal@gatech.edu	Mediating serious issues with faculty advisors, clients, resources, or teammates; honor code; regulation, compliance and legal issues; etc.	Faculty examiners consult the Associate Chair for Academic Administration on major decisions and serious matters pertaining to the course.
Director of Professional and Technical Communication Dr. Brandy Blake brandy.blake@gatech.edu	Help with professional communications. Provide feedback on slides, data visualizations, presentations, and reports.	Dr. Blake does not assign grades but provides input to examiners on team's work ethics and professionalism. Reservations are required in advance for team consultation. Content of these meetings will not be shared with the Senior Design advisors or examiners.
Teamwork Coach Prof. Ann Dunkin ann.dunkin@gatech.edu	Team dynamics, personality traits, and difficult conversations and conflict; On-demand intervention sessions for teams actively struggling with dynamics mid-project	Intervention meetings are by referral from examiners or advisors. Meetings will be confidential and content will not be shared with advisors or examiners, unless it constitutes a violation of the Georgia Tech ethics or student conduct code.
Problem/Solution Consultation/Financial Evaluation	Provide coaching regarding any issues teams may be having in defining the project problem to be addressed and framing the potential solutions to be developed. Provide coaching to teams that are having difficulty identifying and/or estimating the costs and benefits associated with their proposed solutions.	Teams should make advance appointments and seek permission from their faculty advisor prior to arranging an appointment.
Administrative Process Management Ms. Daniela Estrada danieal.estrada@isye.gatech.edu	Management of NDAs, Capstone expo, communications, ISyE studio, classroom reservations, and other non-instructional processes of senior design.	

Resource	*Area(s) of Assistance in ISYE 4106*	*Notes*
Course Teaching Assistants Administrative TA (TBD) Presentation TA (TBD)	Management of Canvas, including documentations, deadlines, and attendances; assistance on presentation scheduling and peer evaluation surveys Presentation coaching, video capturing and editing	
Other ISyE Faculty members	Help you with special technical expertise relevant to your project	You can consult with other ISyE faculty only with faculty advisor's permission.

ANNOUNCEMENTS

Canvas will be the primary mechanism for announcements. It is the students' responsibility to check regularly in case there are necessary alterations to the course schedule and assignments. In addition, any general questions about senior design should be posted to Piazza, rather than emailed to the examiners or advisors.

GRADING

The Senior Design examiners are responsible for determining final grades for all teams and team members. The faculty advisor, other faculty, and client will provide input. The exact grading scale and descriptions of the evaluation guidelines are available in the Senior Design manual. At a high level, the four categories judge the quality of your team's work in four areas: work product, written report, oral report, and professionalism. Quality is based on output, not input (i.e., you earn credit for what you accomplish, not for your effort – but lack of effort may lower your grade, as described below).

- **Work product** includes the team's identification, scoping, modeling, and analysis of the problem, and the team's recommendations to the client. More credit is given for difficult projects, creative solutions, comprehensive analyses, and high value, and a narrowly- scoped or "safe" project will receive less credit than a more ambitious project. The Senior Design examiner will also consider any factors outside the control of the team that might have influenced the project's outcome.
- **Written report** includes how well the report covers the project and how easy it is to read and understand. This includes completeness, conciseness, flow, and writing quality. Correctness of spelling, grammar, word usage, etc. is also important. Hint: use simple language and include quantitative content whenever possible.
- **Oral report** includes how well the presentation covers the project, how easy it is to understand, and how interesting and engaging the speakers are. It includes speaker quality and slide quality.
- **Professionalism** includes the team's attitude, initiative, responsiveness, reliability, work ethic, preparation, independence, honesty, ethics, and integrity (including intellectual integrity).

In addition to the categories above, teams are responsible for meeting all deadlines (including those set by the advisor and/or client, even if they do not appear in the syllabus), submitting all deliverables exactly as requested, maintaining adequate progress throughout the semester, and behaving professionally toward the client, faculty, and fellow students. Failure to do any of these, or any other unprofessional team behavior, will result in penalties to the team's grade.

In general, the ideal is for all team members to receive the same grade. **However, based on their relative overall contributions to the project, as determined by the advisor and Senior Design examiner, team members can receive a different grade (higher or lower) than the team grade.** Grading is not zero-sum; an increase or decrease to one student's grade will not necessarily affect their team members' grades. *It is clear from the grading system (specified in the Senior Design Manual) that everyone must contribute significantly to the engineering solution in order to pass this capstone engineering design course.*

In addition, individual grades can be adjusted downward for professionalism issues like missing individual assignments, missing mandatory meetings (or coming late or leaving early) without prior approval; missing a presentation to the faculty and/or class (even for an interview; companies understand that you need to schedule your interviews around immovable academic commitments); unprofessional behavior, attitude, or dress during a formal or informal meeting; violating course rules; failing to respond in a timely manner to a request from the client, faculty advisor, or Senior Design examiners; other unprofessional behavior; etc.

Modifications to teams' and individuals' grades will be assessed by the Senior Design examiners depending on severity of the situation. They may be assessed relative to the team's grade (e.g., 1⁄3 letter- grade higher, 2 letter grades lower, etc.) or on an

absolute scale (e.g., an F in the course irrespective of your team's grade) or even include termination from the course midway through the semester.

Since Georgia Tech does not currently use plus or minus grades on transcripts, the difference in the grades of team members may not coincide exactly with the grade adjustments; for example, if a team's project grade is B- and one team member received a one-third-letter grade reduction to C+, then that team member's transcript will show a grade of C and all other team members' transcripts will show a B.

PRESENTATIONS AND REPORTS

Each of the phases of Senior Design other than project selection culminates in a presentation and report delivered to the faculty and client.

- **Presentations:** Since the faculty and client audiences have different knowledge, experience, and needs, you are required to create two separate presentations at each phase: one targeted to the faculty and the other targeted to the client.
- **Interim and Final Reports:** To avoid writing becoming a major time burden on teams, only one Senior Design report is required at each phase. The body of a report (limited to 10 pages) should provide a concise business case for your project - justifying the problems and solutions with specific evidence and explanation while additional technical details should be placed in appendices.

All presentations and reports should be approved by your faculty advisor before being submitted to Canvas or delivered to the client.

All presentations and reports should be received by the client no later than the time of the client presentation. Client presentations must be scheduled at times that are suitable for all attending parties (all team members, the faculty advisor, and all client-side attendees). You may hold one or more of your client presentations on campus, provided that the client agrees.

Additional Presentation Guidelines

- Each team member must present a significant portion of either the faculty or client presentation at the end of every phase.
- Each team member who presents to the faculty at the interim stage must present to the client in the final presentation. Each team member who does not present to the faculty at the interim stage must present to the faculty in the final presentation and to the client at the interim stage.
- Speakers should not use any notes for presentations; it gives the impression that you don't know enough about your project.
- **Presentations should not sound memorized or recited**; as above, it gives the impression that you don't know enough about your project and have only "learned your lines" like an actor.
- Time limits and formats for the in-class (faculty) presentations are:

	Time limit	Attire	Format
Proposal	≤ 7 minutes	Business Casual	Conference Room
Interim	≤ 12 minutes	Business Attire	Conference Room
Final	≤ 20 minutes	Business Attire	Classroom

FEEDBACK

Faculty advisors will provide feedback and guidance to their teams throughout the semester. Faculty advisors are also responsible for communicating their teams' progress to the Senior Design team examiner throughout the semester and receiving feedback. The Senior Design examiner will provide oral feedback to you after the project proposal presentation and written feedback after the interim progress presentation. In both cases, the Senior Design examiner's feedback may be expanded in more detail by your faculty advisor.

Students will provide peer evaluations to the Senior Design examiner after the proposal, interim, and final presentations to the client. This input will be used in addition to the faculty advisor's opinions when determining grade adjustments and/or reductions.

If at any time the Senior Design examiner determines that a team or individual's progress and accomplishments are unacceptable, then the Senior Design examiner has the discretion to determine the remedy. Remedies include requiring special assignments for individuals or the team, modifying a team's or individual's grade, or terminating that team or individual's participation in the course.

Beginning in Summer 2008, ISyE instituted a **no-drop policy** for Senior Design. Once their first pre- proposal is submitted, students are only allowed to drop the course with special permission from the Associate Chair for Undergraduate Programs. Permission is generally granted only in extreme situations (serious illness/injury, etc.). The reason is that you're depending on your teammates for their contribution in order for your project to be able to earn a good (or even passing) grade, and it would be unfair for your grade to be jeopardized if your teammates wanted to drop the course.

TENTATIVE SCHEDULE

Senior design sections use two types of scheduling blocks: MWF 12:30-3:15 pm and W 6:30-9:15 pm, and TRF 12:30-3:15 pm and W 6:30-9:15 pm. These times are set aside for your team to attend mandatory events, work together, visit your client site, present, and/or meet with your faculty advisor. Only Georgia Tech official excuses are acceptable for absences.

There are three milestones in senior design: proposal, interim report and final report. Each milestone has its specific elements and due dates. Since there are no regular classes, please read and review the schedule carefully. All activities listed on the schedule are mandatory, unless specified otherwise. It is your responsibility to comply with the timeline. The missed deadlines and attendances carry automatic grade deductions.

Toward the end of semester, you will also prepare a poster to be presented at the Georgia Tech Capstone Expo and a project summary for record-keeping. After the semester ends, senior design teams will ensure that all the relevant data and other files are stored in their Senior Design Teams channel.

Wk	*Date* [1]	*Time*	*Location*	*Activity*
1	W 1/13	6:30 pm	TBD	Introduction Session, full class of all sections
2	M 1/18	10 am	Canvas	**Deadline:** submit proposal presentation (faculty version) [2][3]
	1/19 – 1/22	Class Time	ISyE Studio	Team: present proposal to faculty [4]
3	1/25 – 1/29		Client Site or Virtual	Team: present proposal to client [5]
	M 1/25	10 am	Canvas	Deadline: submit team contract/charter
	W 1/27	6:30 pm	TBD	Full class: Seminar/Workshop (Content TBD)
	F 1/29	10 am	Canvas	**Deadline:** Proposal wrap-up memos. Not all teams; determined by examiners at proposals
	F 1/29	10 am	Feedback Loop link	**Post Proposal Peer Evaluations due**
4	W 2/3	6:30 pm	TBD	Full class: Seminar/workshop (Content TBD)
5	W 2/10	6:30 pm	TBD	Full class: Seminar/workshop (Content TBD)
6	W 2/17	6:30 pm	TBD	Full class: Seminar/workshop (Content TBD)
7	W 2/24	10 am	Canvas	**Deadline:** Dr. Blake Workshop videos due [6]
8	W 3/3	10 am	Canvas	**Deadline:** submit interim progress report [3]
10	M 3/15	10 am	Canvas	**Deadline:** submit interim presentation (faculty version) [2][3]
	3/16 – 3/19	Class Time	ISyE Studio	Team: present interim progress to faculty [4]
11	3/22 – 3/26		Client/Virtual	Team: present progress and deliver interim report to client [5]
	W 3/24	6:30 pm	TBD	Full class: Seminar/Workshop (Content TBD)
	F 3/26	10am	Feedback Loop link	**Post Interim Peer Evaluations due**
12	TWR 3/30 – 4/1	Class Time	ISyE Studio	Dr. Blake: Hands-on technical communication workshop sessions [7]
	W 3/31	6:30 pm	TBD	Full class: Alumni Panel
14	W 4/14	10 am	Canvas	**Deadline**: Dr. Blake Workshop videos due (including Poster Design) [6]
15	M 4/19	10 am	Canvas	**Deadline:** submit final presentation (faculty version) [2][3]
	4/20 – 4/23	Class Time	TBD	Full class: present final project to faculty and class [4]
16	M 4/26	10 am	Canvas	**Deadline:** submit final report [3]
	M 4/26	10 am	Canvas	**Deadline:** submit final poster [8]
	T 4/27	3 pm - 8 pm	TBD	Georgia Tech Capstone Design Expo
	4/26 – 5/4		Client/Virtual	Team: present and deliver final report to client [5]
17	T 5/4	11 am - 2 pm	TBD	Senior Design showcase presentations
	W 5/5	10 am	Feedback Loop link	**Final Peer Evaluations due**
	R 5/6	10 am	Qualtrics link	**Senior Design Outcome Survey due**
	F 5/7	10 am	Canvas	**Deadline:** project file submission confirmation
	F 5/7	10 am	Canvas/Weblink	**Deadline:** fill out web form for project summary

[1] Date includes both MWF and TWR sections.

[2] If your project has an NDA between your client and Georgia Tech and your NDA allows, you can include proprietary information in the proposal and interim presentation and get everyone attending the presentation to sign the NDA signature sheet. The final

presentation should not include proprietary information. **If each team member signed the individual NDA by the client, do whatever your NDA tells you to do**.

(3) Name your files "TeamNumber_Client_SubmissionType.pptx"; for example, "12_Emory_Ortho_InterimPresentation.pptx".

(4) Both afternoon and evening class times may be used. For proposal and interim presentations, each team will be assigned a specific time to be present. Attendance is mandatory, even if you are not presenting. **For final presentations, each team member must attend the presentations of at least three other teams in their presentation session and fill out feedback forms.**

(5) **All team members and the faculty advisor must be present at client presentations**; the scheduling is up to you, your advisor, and the client.

(6) Each team member must watch and turn in notes for at least 3 of Dr. Blake's videos on Canvas on these two separate deadlines. While these are turned in individually, teams should plan to watch different videos so that the team as a whole covers as many of the videos as possible. (Note: The media gallery may have videos by people who are not Dr. Blake. These do not count for this requirement – only Dr. Blake's videos.) New content may be added throughout the semester.

(7) Workshop Sessions: These slots will be broken up into 3 or 4 sessions (~1.5 hours each). Your team will be expected to sign up for one of these sessions. At least half of your team will be required to attend the session you sign up for. In this workshop, you will discuss your project with another team, using white boards to draw out and explain your project on the fly to practice helping other ISyE students understand what your project is, how you are approaching it, and why you chose that specific approach.

(8) If your project has an NDA, you must seek approval from client to release the poster prior to printing. The approval should be in writing (email is fine) and should be forwarded to the senior design management for documentation. Your grade will not be impacted if the client does not approve release of poster, but you should inform the examiners to seek a remedy. **If you need help from ISyE to print the poster, you must submit the poster by an earlier date (to be announced)**.

NOTES:

- Your faculty advisor may also require you to meet other deadlines (e.g., providing him/her with a copy of your reports a week before the submission deadline).
- Adjustments to the schedule may have to be made and will be published through Canvas.

Attendance at presentations and weekly meetings with the advisor are mandatory (unless otherwise instructed); be on time and don't leave early.

FILE & PROJECT MANAGEMENT

We have an MS Teams site for each Senior Design cohort. The site has a general channel and private channels for each senior design team. The advisor of a team and the examiners will have access to the team's channels. Senior design teams are **required** to use their private channels to archive ALL their work products, manage team chats and their project in general. Do NOT use Google drive or your own file storage system.

To facilitate communications and accountability within a team, we ask each team to fill out a Team Charter (contract). The template is provided on the Canvas course website. Each member of the team is required to sign the document. The contract will serve as a basis for team coordination. Feel free to modify your Team Charter as your project progresses. Save each version of your Team Charter on your private Teams channel.

GENERATIVE AI USE

Always check with your client before using any AI tool. Use only Georgia Tech's Copilot with your GT credentials, which provides appropriate protection. Most teams have NDAs in place. Uploading any client-specific information or data into a chat box is a violation of the NDA and may be illegal. If you use an AI tool, you must do so responsibly and appropriately, maintaining compliance with both your client's requirements and Georgia Tech guidelines (read Georgia Tech AI Guidelines). You are required to read and understand the guidelines on AI tool usage provided in the *Senior Design Manual* (Appendix D).

LEGAL ISSUES

Some projects may require use of clients' proprietary or confidential information. Please refer to the Senior Design Manual for discussion of legal issues regarding NDAs, PIAs, etc.

ACADEMIC INTEGRITY

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

ACCOMMODATION FOR STUDENTS WITH DISABILITIES

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail the examiners as soon as possible in order to set up a time to discuss your learning needs.

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. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.