CEE 8813 Syllabus

Innovation and Entrepreneurship in Civil and Environmental Engineering
Class Meets Mondays and Wednesdays 2:00pm - 3:15pm
3 credits
Spring 2027

Instructor Information

Instructor	**Email**
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General Course Information

Description

This course is designed to acquaint students with the dynamics associated with technological innovation and entrepreneurship in the civil and environmental engineering (CEE) field. In this course, we will examine innovation and entrepreneurship in CEE through lectures, simulations, discussions and critical analyses of entrepreneurial ventures and case studies, and through interactions with CEE innovator, entrepreneur, commercialization and investor guest speakers. Students will participate in simulations on the impact of industry structure on various forms of ventures. Students will also participate in a semester project that involves planning out the details of ideation, customer discovery, financing, and implementation of a new CEE venture.

Course Learning Objectives

- Students will develop skills to start a new venture in the CEE domain.
- Students will experience ideating, customer discovery, planning, financing and implementing a CEE entrepreneurial venture.
- Students will be exposed to the industrial dynamics that impact new ventures formed in the CEE domain.
- Students will gain insight into new venture formation challenges and opportunities from CEE industry examples and case studies discussed in class.

Required Course Materials

Several academic papers will be assigned that cover aspects of innovation and entrepreneurship in CEE. These are downloadable for free if you are on campus (or connected via VPN) or will be provided. Additionally, three case studies will be assigned. Students are required to purchase these case studies and read them prior to class. Required readings include:

- Case Study 1: “Henry J. Kaiser and the Art of the Possible,” 9-408-072 (Harvard Case)

- Case Study 2: Taylor, J., and Levitt, R. (2007). "Innovation Alignment and Project Network Dynamics: An Integrative Model for Change." Project Management Journal, 38(3) 22-35. (Free access to article if on campus/VPN)
- Case Study 3: HCB Business Plan and Halley, T. and Taylor, J. "Elements to Critique in a Business Plan" (both provided on Canvas)
- Case Study 4: "BetterLiving Patio Rooms," BAB072 (Harvard Case)
- Case Study 5: "KONE: The Monospace Launch in Germany," 9-501-070 (Harvard Case)

Optional Course Materials

The course will follow content from Technology Ventures: From Idea to Enterprise, McGraw Hill NY, NY, authored by Byers, Dorf and Nelson. However, you are not required to purchase the textbook. The specific chapters covered during the class sessions are included in the detailed course schedule at the end of this syllabus.

Grading Policy

Grade components will be weighted as follows in computation of the final course grade:

Case Studies	**25%** [5% for each of 5 case study write-ups]
Reality Checks	**25%** [5% for each of 5 reality check write-ups]
Venture Project	**50%** [25% report, 15% pitch, 2% for each of 5 milestones]

Description of Graded Components

Assessment of student performance during the course will be based on several elements and deliverables. The relative importance of these elements is summarized above. While independent from each other, the various assignments and performance measures build on each other. Thus, students should recognize the importance of sustained effort throughout the course. The final consideration in the grade will be based on an assessment of each individual's performance as a team member by their fellow team members. This latter element is intended to ensure all team members participate actively in all group activities.

Your final grade will be assigned as a letter grade according to the following scale:

- A 90-100%
- B 80-89%
- C 70-79%
- D 60-69%
- F 0-59%

At Georgia Tech, grades are awarded on a scale of A-F with no +/- grades permitted. Much of the effort in this course is based on group work. According to policy, grades at Georgia Tech are interpreted as follows:

- A Excellent (4 quality points per credit hour)
- B Good (3 quality points per credit hour)
- C Satisfactory (2 quality points per credit hour)
- D Passing (1 quality point per credit hour)
- F Failure (0 quality points per credit hour)

See http://registrar.gatech.edu/info/grading-system for more information about the grading system at Georgia Tech.

The class will consist of various assessments: case study write-ups, reality check write-ups, and a venture project consisting of a final report, pitch and intermediate milestones. As students in this course, your team will need to identify an opportunity, create a company concept that delivers a product or service to the engineering industry, and perform an entrepreneurial pitch. The in-class exercises and some of the assignments are designed for you to ideate as a team, conduct analyses on your innovation, create a company concept, and ultimately produce elements of your final business plan report.

Case Study Write-ups

Case write-ups are intended to allow you to consider the implications of forming an entrepreneurial technology venture. These must be submitted by the start of class on the day they are assigned. Case study questions will be posted in advance of the due date. These write-ups should be approximately 1 page in length.

Reality Check Write-ups

Students in the class will prepare a written report and be prepared to discuss their critical analyses of five class sessions focused on real ventures/investors/experts. I am primarily interested in your critical analyses, not summarization. Grading will be based on quality, clarity, insightfulness, professionalism, thoroughness and incisiveness. The write-up should be approximately 1 page in length.

Venture Project

Students will work individually or in small groups on a semester venture project. The project requires a written report in the form of a business plan, an oral presentation of your plan, and submission of five venture milestone deliverables. Reports should be a maximum of 8 pages. In addition to the correctness, insightfulness, referencing, and thoroughness of your analysis, you will be evaluated on the professionalism of your written presentation. Team members are expected to contribute equally to this project. In cases where specific members of the team do not contribute their share of the work, the written report should contain a statement to this effect. Final venture presentations should be a maximum of 10 minutes. This is to be presented during the final week of classes. In addition to the correctness and thoroughness of your presentation, you will be evaluated on the professionalism of your oral presentation and your ability to comprehensively respond to questions. All deliverables must be submitted on time in order to receive full credit.

USG Required Course Policies

Attendance and/or Participation

While attendance and/or participation is not formally required in the course, students will be strongly encouraged to participate in all facets of the course.

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.

Additional Georgia Tech Required Policies

Accommodations 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 me 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.

Pre- &/or Co-Requisites

There are no formal course pre-requisites for this course, however, students who have prior curricular and co-curricular activities in system ideation, business operation and team oriented exercises will have the opportunity to advance their experiences. Only students with Junior/Senior standing are permitted in the course.

Collaboration, Group Work, and Use of Generative AI

Given the importance of collaboration and teamwork in initiating and growing an engineering system (product or company), this course is predominantly based on group activities and effort. A portion of the overall course grade is based on assessment by fellow team members of each individual's effort and contribution, thus students should keep this obligation to their fellow team members in mind.

Campus Resources for Students

Students are encouraged to familiarize themselves with any resources that might help them succeed in the class (e.g., the library, The Communication Center, or The Center for Academic Success. The instructors also enthusiastically support students reaching out to resources that support mental and emotional wellbeing (e.g., The Counseling Center, The Division of Student Life, or Women's Resource Center). Click here for a list of relevant campus resources available to Georgia Tech students.

Course Schedule

Topic	Milestone	Reading	Due
1. Introduction	*Self-assessment*		-
2. CASE STUDY 1: Kaiser		Kaiser Case	Case Study 1
3. Ideation			-
4. REALITY CHECK 1: CREATE-X Demo Day			Reality Check 1
5. WORKSHOP 1a: Ideation - Brain Storming			-
6. WORKSHOP 1b: Ideation - Team Forming	Venture Concept & Team		Milestone 1
7. CASE STUDY 2: HCB, Elements of Business Plan		Elem. of Bus. Plan + HCB Plan	Case Study 2
8. Innovation			-
9. CASE STUDY 3: BIM, Diffusion & Market Structure		Innov & Ntwk Dyn	Case Study 3
10. REALITY CHECK 2: Intellectual Property			Reality Check 2
11. CASE STUDY 4: Better Living Patios		Better Living Patios Case	Case Study 4
12. Vision/Mission/Values			-
13. WORKSHOP 2: Vision/Mission/Values	Vision/Mission /Values		Milestone 2
14. Strategy/Positioning/USP			-
15. WORKSHOP 3: Strategy/USP/Positioning	Strategy/USP/ Positioning		Milestone 3
16. Sales & Customer Discovery			-
17. Venture Pitching			-
18. REALITY CHECK 3: Real Pitch			Reality Check 3
19. WORKSHOP 4: Customer Discovery	Customer Discovery		Milestone 4
20. Business Model / Market Sizing			-
21. CASE STUDY 5: Kone		Kone Case	Case Study 5
22. WORKSHOP 5: Business Model and Market Sizing	BizModel/ MktSize		Milestone 5
23. Financial Projections			-
24. REALITY CHECK 4: Entrepreneur			Reality Check 4
25. Raising Capital			-
26. REALITY CHECK 5: Venture Capital			Reality Check 5
27. Venture Pitches	Venture Pitch	-	Venture Pitch
28. Venture Pitches			-
29. Summary + Next Steps	Venture Plan	-	Venture Plan