

Title: *Technology Entrepreneurship: Teaming, Ideation, and Entrepreneurship: ECE 6001*

Abbreviated Title: *Technology Entrepreneurship*

Instructor: Henry Owen (owen@gatech.edu)

Description: The course teaches evidence-based entrepreneurship skills and principles, benefiting students launching a business or pursuing careers with technology and innovation driven companies. We designed the course to be an experiential, project-based, innovative, and cross-curricular program educating and developing future engineers and entrepreneurs through discovery and “real-world” experiences.

Pre-requisites: Graduate standing

Credits: 1-2-3-3

1= 1-hour lecture, 2= 2-hour studio session, 3= 3-hours unsupervised lab, 3= total credit hours

Purpose of Course: Provide graduate MSECE students with the necessary vocabulary, knowledge, skills, and experience to understand entrepreneurship and intrapreneurship terminology and principles—21st Century engineering skills. Different elements include: customer discovery, intellectual property, minimum viable product (MVP), pivots, teaming, business canvas, business hypothesis testing, pitches, ideation, leadership, negotiation, finances, grant proposals, ethics, and capital raises.

Topical Outline Overview: The course is structured around 3 platforms: 1) *Weekly lectures* on the elements of entrepreneurship and intrapreneurship ranging from how opportunities are identified, to how ideas are conceived, to what customer discovery means, etc., 2) *Unsupervised lab* for Real-world interactions for students and teams to develop and validate their ideas through customer conversations, and to prepare weekly presentations delivered during studios, and 3) *Studio* sessions where teams conceive a startup idea, perform customer discovery to form a compelling business model, model customer validation to prove market viability of the startup concept, present weekly team updates, and receive coaching on their projects.

Grading: A = 900 – 1000, B = 800 – 899, C = 700 – 799, D = 600 – 699, F < 600

Individual or Group	Description	Percentage Points	
Individual	Tests (3)	30	300
Individual	Quizzes (10)	15	150

Group/Individual	Presentations & Assignments	30	300
Individual	Participation, Engagement, & Attendance	10	100
Group	Final Presentation	15	150
	Total	100	1000

Topical Outline:

Lecture Series

This didactic format will focus on a variety of elements of entrepreneurship and intrapreneurship. This will be a weekly lecture. The regular lectures will include the topics outlined below. Please note this is an overview, and the order, and repetition, or topics will be adjusted to maximize learning and accommodate guest lectures.

Ideation: Technology driven ideation of solutions to address market opportunities. How can technology be leveraged to achieve both differentiation and entry barriers? How can the time to market be balanced against completeness of technology?

Evidence-Based Entrepreneurship (EBE): What is evidence-based entrepreneurship? What does evidence mean? How is evidence gathered? What does evidence gathering accomplish?

Lean Startup Methodology: Developing businesses, products, and services through a method to shorten development cycles. How can we employ this approach on a constructed timeframe and adopt these techniques during the course?

Customer Discovery: Do customers validate business hypothesis consisting of the opportunity and potential solution? How should customer discovery be done?

Cognitive Biases: What are cognitive biases? How do they impact customer discovery? How do you control for them when doing customer discovery?

Business Models Canvas: What is the business model canvas? What are the nine elements of the canvas? How do the elements relate to each other? How does evidence-based entrepreneurship use a business model canvas?

Pivoting: How to pivot product and business models based on customer discovery and validation? How to choose pivot direction?

Rapid Prototyping: How to build a rapid prototype of a product? What are the modalities available? How can the rapid prototype help learn about what the product must be? How to use customer discovery in defining the Minimum Viable Product (MVP)?

Intellectual Property: What is the definition of intellectual property? How is it viewed, and valued, at a startup company vs. an established company?

Financing: How much capital does the venture require? How to raise this capital? In what increments should the capital be raised? What are likely liquidity events? What are the tradeoffs?

Teaming: What kind of a team is required for fulfilling the vision of the venture? When should the team members be added? How should the team members be compensated?

Leadership: What is leadership? What are the different models of leadership? Can leadership be systematically cultivated?

Storytelling: How to tell an effective story? What can be learned from effective storytelling mechanisms such as movies?

Intrapreneurship: How can an employee act like an entrepreneur within a larger organization? What are the similarities and differences?

Student Learning Outcome:

- 1) Demonstrate an understanding of Evidence based Entrepreneurship through identification and analysis of potential technology-based business opportunities.
- 2) Apply the scientific method in customer discovery interactions through designing, executing, and evaluating business hypotheses.
- 3) Create a Minimal Viable Product (MVP) for one or more prototype business theses.
- 4) Demonstrate an understanding of the importance to continuously learn and improve in the following skills that are an important part of entrepreneurship as well as intrapreneurship: 1) Critical thinking and problem solving, 2) Oral/Written Communication, 3) Teamwork and collaboration, 4) Leadership, 5) Professionalism and ethics, and 6) Career Management.

Entrepreneurship Studio:

For this format of the class, students will divide and work in teams. Each team will pursue a concept developed by the team. The concept could be a tangible product that supports the Ga Tech “maker culture” and can be built by the team calling upon their skills in the ECE realm. The concept must allow for customer discovery, with a sufficiently large local market. The instructor must approve the concept.

This course follows an evidence-based entrepreneurship methodology. Each week, students will identify hypotheses about who their customers might be and what problems or needs they have. They will then interview potential customers and partners

in their market's ecosystem through informal conversations. In this class students will learn how to secure, conduct, record, and assess these informal conversations. The results of these conversations will be presented in class. The studio instructor team will review the progress and help to redirect the teams as needed. Much of the learning comes from watching and participating in this interaction with other teams. Teams will use this process to set the details on their business model canvas.

The nuts and bolts of how to make good hypotheses, how to identify people to interview, how to get the meetings and what to ask, and finally, how to interpret the results will be covered as part of entrepreneurship basics.

One method to consistently provide a snapshot of the business, is to use a *Business Model Canvas*. The sections of the business model canvas to be covered are: Customer Segments; Value Proposition; Revenue Models and Channels; Metrics; Key Resources and Activities; Cost Structure and Partners.

In the first half-ish of the semester, teams will focus intensely on finding a verifiable problem and value proposition. In the second half of the semester, teams will shift to gathering proof that there is a viable product that can deliver the value proposition.

The studio instructors will offer sufficient time for office hours to allow teams to get individualized help. The goal of this portion of the class is to learn a method for going from a vision to a proven concept with strong potential for value creation.

Textbooks: (Free for students, download non-profit versions)

1. Talking to Humans, Constable & Rimalovski, <https://www.talkingtohumans.com/> (Links to an external site.)
2. Testing with Humans, Constable & Rimalovski, <https://testingwithhumans.com/> (Links to an external site.)

Optional Reading:

3. Business Model Generation, Alexander Osterwalder (\$25)
4. Value Proposition Design: How to Create Products and Services Customers Want (Strategyzer), Alexander Osterwalder, Yves Pigneur, Greg Bernarda and Alan Smith (\$25)
5. Testing Business Ideas, Alexander Osterwalder and David Bland (\$25)
6. The Lean StartUp by Eric Ries, 2011. (used or new between \$5-15)
7. Entrepreneurship, Theory, Process, Practice by Donald F. Kuratko – Cengage publishing (\$200)
8. Launching New Ventures by Kathleen R. Allen – Cengage publishing (\$129)
9. Understanding Management by R. Daft and D. Marcic – Cengage publishing (\$100-200)
10. Leadership by Peter Northhouse – Sage publishing (\$15-90)

11. Technology Ventures, Byers, Dorf, and Nelson (\$10-130)
12. The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company, Blank (\$20)
13. Thinking: Fast and Slow, D. Kahneman (\$10)
14. The Founder's Dilemma, Noam Wasserman (\$10)

Instructor Commitment:

All of the instructors commit to dedicating our time and energy to ensure that you have a productive learning environment for this course. In addition, our goal is to maximize evidence-based teaching methods to further enhance the educational experience. Examples include a highly-interactive class environment, self-paced learnings outside of the classroom, as well as reflective in-class exercises.

Student Commitment:

As the student, you agree to commit time and energy to learn the material by completing all assignments in a timely manner, attending all class sessions, and seeking help when required.

Academic Honesty:

All violations of the Georgia Tech Honor Code will be handled by referring the case directly to the Dean of Students for investigation and penalties. As a reminder to students, violations of the Honor Code can be met with minimum drop of one letter grade in their final course grade and potentially academic probation.

Students are expected to act according to the highest ethical standards. The immediate objective of an Academic Honor Code is to prevent any Students from gaining an unfair advantage over other Students through academic misconduct. The following clarification of academic misconduct is taken from Section XIX Student Code of Conduct, of the Rules and Regulations section of the Georgia Institute of Technology General Catalog: Academic misconduct is any act that does or could improperly distort Student grades or other Student academic records. Such acts include but need not be limited to the following:

- Unauthorized Access: Possessing, using, or exchanging improperly acquired written or verbal information in the preparation of a problem set, laboratory report, essay, examination, or other academic assignment.
- Unauthorized Collaboration: Unauthorized interaction with another Student or Students in the fulfillment of academic requirements.
- Plagiarism: Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating the authorship.
- False Claims of Performance: False claims for work that has been submitted by a Student.

- Grade Alteration: Alteration of any academic grade or rating so as to obtain unearned academic credit.
- Deliberate Falsification: Deliberate falsification of a written or verbal statement of fact to a Faculty member and/or Institute Official, so as to obtain unearned academic credit.
- Forgery: Forgery, alteration, or misuse of any Institute document relating to the academic status of the Student.
- Distortion: Any act that distorts or could distort grades or other academic records.

While these acts constitute assured instances of academic misconduct, other acts of academic misconduct may be defined by the professor. Students must sign the Academic Honor Agreement affirming their commitment to uphold the Honor Code before becoming a part of the Georgia Tech community. The Honor Agreement may reappear on exams and other assignments to remind Students of their responsibilities under the Georgia Institute of Technology Academic Honor Code.

Late Assignments:

If you're aware an assignment will be late, please discuss with me prior to the due date. Otherwise, late assignments will be accepted, but for each 24 hour period the assignment is late, the assignment will be reduced one letter grade or point equivalent of one letter grade.

Absences and Attendance:

We have prepared a hybrid course that provides face to face and streaming synchronous lectures and studios. The combination of formats mirrors what most companies are employing today. We plan to record our lectures and studios. Class recordings, lectures, presentations, and other materials posted on Canvas are for the sole purpose of educating the students currently enrolled in the course. Classes may not be recorded by students without the express consent of the instructor unless it is pursuant to an accommodation granted by the Office of Disability services.

Students may not record or share the materials or recordings, including screen capturing or automated bots, unless the instructor gives permission. Digitally proctored exams may require students to engage the video camera, but those recordings will not be shared with or disclosed to others without consent unless legally permitted.

We will comply with Georgia Tech (GT) guidelines to safely teach and attend the class. Students are expected to be familiar with and abide by the Institute guidelines, information, and updates related to Covid-19. Find campus operational updates, Frequently Asked Questions, and details on campus surveillance testing and vaccine appointments on the [Tech Moving Forward site \(Links to an external site.\)](#).

We have structured the course to accommodate both in-person and remote learning. We will follow GT guidelines and, if allowed, will accommodate requests for remote learning. If you do not attend the class in person, you must participate via a synchronous feed of the class. Students, that are not in person, shall have their video

feeds streaming during lectures and studios. Students are required to attend the class unless granted an excused absence. Attendance will be taken in-person and via streaming video during class.

If you feel ill or have a temperature, please **do not** attend the live class. You should plan to attend remotely.

Institute policy on absences for illness or personal emergencies may be found at: <http://www.catalog.gatech.edu/policies/student-absence-regulations/> (Links to an external site.)

Note: GTL students should contact resources at GTL campus not the Atlanta campus as described below:

For illnesses, students are responsible for providing the documentation to the Office of Student Life where it will be treated and handled confidentially with necessary information being submitted to the student's instructors for that term.

If you must miss class due to a personal emergency then you should contact the office for the dean of students at (404) 894-6367 or fill out a form requesting assistance at:

<https://studentlife.gatech.edu/content/class-attendance>. The dean of students will then verify the personal emergency with your instructors.

If you have an institute approved activity that will cause you to miss class, then you must provide an institute approval letter by filling out the form at:

<https://registrar.gatech.edu/node/97>.

When properly documented, any of the instances above will constitute an excused absence and you should inform Prof. Mihalik (gmihalik@gatech.edu) without providing any confidential information. If your absence involves missing a quiz or presentation, you must coordinate a means to satisfy those requirements with Prof. Mihalik, as soon as possible.

Office of Disability Services:

If you are a student registered with the Office of Disability Services (ODS), please make sure the appropriate forms and paperwork are completed by Prof. Mihalik within the first week of classes. The instructors will abide by all accommodations required by ODS. It is the responsibility of the student to properly arrange test accommodations for each quiz with ODS in sufficient time to guarantee space for quiz administration. ALL quiz accommodations must be handled through ODS. If the student does not register accommodations with ODS for the quiz, then the student will take the quiz at the normally scheduled times, without any additional accommodation unless the instructor is given specific directive from ODS on the students behalf due to a mitigating circumstance.

Diversity Statement:

The School of Electrical and Computer Engineering is committed to creating, supporting, and maintaining an inclusive, equitable, and respectful environment. Our training approach hinges upon bringing together individuals with various backgrounds, as well as academic and industrial experiences, to challenge each other. Critical to enhancing our training approach across multiple dimensions, is the inclusion of diversity in gender, age, race, ethnicity, sexual orientation, and socioeconomic backgrounds. In this course, our approach is hypothesis-driven. Hence, the goal is to critically assess and vet ideas, for the overall benefit of teaching a methodology. Furthermore, the intent is broadening approaches for problem-solving and ultimately value creation. We rely upon the diversity of our community to seed innovation, and share unanticipated perspectives within our course. Therefore, it is essential that we conduct ourselves in a respectful and professional manner as we are exposed to a variety of thinking approaches. Thus, we rely upon our students, instructors, faculty and staff to contribute to the diversity, equity, and inclusiveness of our course environment.