APPL 412

Design and Making: Turning your entrepreneurial ideas into reality

Spring 2020

Introduction	Have you ever had idea for a product but didn't know how you could make it yourself? In this class, you will make it! At the start of the semester, you will brainstorm ideas for entrepreneurial needs, and the final product will be a device or process that addresses the need.
Methods	You will go through the entire design and fabrication process in this semester-long project. You will work in small groups and get feedback throughout the semester from potential stakeholders. These are people who would use or purchase your product, or have other expertise that can help to improve your design. Class will consist of lectures, discussions, brainstorming, and time to work on prototype fabrication. While you will be focusing on your own project, you will also be giving feedback to your peers throughout the semester. You should expect to spend a significant amount of time outside of class working on your project.
Results	By the end of this course, you should be able to: • Perform a needs assessment to determine the most important needs to address • Structure your time management over a semester-long project • Operate within a budget • Work as part of a multi-disciplinary team that includes students, faculty, and stakeholders who are potential users or beneficiaries of the device that you are developing • Use the library and online resources for background research • Experience an iterative design process, getting feedback from stakeholders throughout • Use CAD software and 3-D perspective drawing to design prototypes • Use facilities in BeAM to fabricate prototypes • Use principles of universal and human centered design to develop designs • Communicate information about your project, both in oral and written form
Discussion	You will develop your engineering and entrepreneurial skills throughout this semester. You will use the resources of the BeAM makerspace to design and fabricate your project. You will receive appropriate background and training in both mechanical and electrical design to enable you to turn your ideas into reality. After the semester is over, you are encouraged to pursue any entrepreneurial opportunities that may develop from this project.
Engineering Student Outcomes	• An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. • An ability to communicate effectively with a range of audiences • An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

	- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. - Demonstrate constant curiosity about our changing world. - Integrate information from many sources to gain insight. - Persist through and learn from failure. - Discern and pursue ethical practices

Class Essentials

➤ CONTACT INFORMATION

Dr. Richard Goldberg	Teaching assistants
🏢 **Office Location** 156 Caudill Labs ✉ **Email** r.goldberg@unc.edu 📞 **Phone** 919-966-5768	N/A

➤ LOGISTICS

🕐 **Class meeting times** Tues/Thurs 2:00-3:15pm 📍 **Class meeting location** Phillips 208 📅 **Office Hours** Before or after class or by appointment	📖 **Required Texts & Software** - The Field Guide to Human Centered Design, available online at https://www.designkit.org ➜ **Pre-requisites** - APPL 110 or permission of the instructor - Orientation in BeAM makerspace (can be done during first week of semester)

Course content

➤ COURSE TOPICS

- Inspiration
  - o Needs identification
  - o Background research
  - o Identify and interview stakeholders
- Ideation
  - o Brainstorm initial design ideas and prototyping methods
  - o Technical drawing
  - o Get feedback and iterate

- Implementation
  - Incorporate standards
  - Technical Communication
  - Evaluate with verification and validation

➢ COURSE SCHEDULE

See Sakai for detailed schedule

To help you succeed

➢ COURSE EXPECTATIONS AND POLICIES

Expectations and policies:
- Watch all online lectures and do all reading assignments before coming to class (in-class quizzes will help to encourage you to do this).
- Participate in class discussions.
- During class time, do not use your phone or computer for something unrelated to class; research shows that this is distracting to other students in the class. If there is an urgent situation, then you can leave the classroom to use your phone or computer.
- Come to every scheduled class and lab session and let me know ahead of time if you cannot attend.
- Turn in assignments on time; if an assignment is up to 24 hours late, there is a 25% deduction, and if an assignment is beyond 24 hours late, you will get a zero. If you need an extension, you must ask at least 24 hours before the time that the assignment is due (you can avoid a grade deduction this way).
- You and your partners should contribute an equal amount of effort toward your project. If you feel that you are working much harder than your partners, you should talk to your partner first, and then let one of us know if the situation does not improve.
- When visiting and working with others outside of our class, conduct yourself in a professional manner
- Follow all BeAM safety guidelines

➢ STUDENT RESOURCES

SEE, SAY, DO SOMETHING
We're happy you are here and eager to learn. Despite our best intentions to follow a plan, life may throw us a curve ball. If you or someone you know is experiencing some distress or you are concerned about the well-being of a student, please report it here: https://deanofstudents.unc.edu/carereport. It is important to support one another. If you see something, say, and do something.

ACCESSIBILITY RESOURCES
UNC-CH provides accommodations for any students with documented disabilities. If you have a disability and believe you require accommodations, please contact the Department of Accessibility Resources at http://accessibility.unc.edu. Please contact me early in the semester so we can make any necessary arrangements and discuss the learning checks.

Assignments & Evaluation

➢ **YOUR COURSE GRADE**			
25% final prototype	Final project prototype	**15% Writing assignments**	Individual report writing assignments
5% mid semester prototype	Prototype that illustrates your design idea	**15% Individual homework assignments**	
10% group homework assignments	Various assignments during semester	**10% Peer and faculty evaluations**	You receive an evaluation score on your efforts within your group
10% final group report	Final written report on your project		
10% lab notebook	Maintain a lab notebook each week		
60%: group grades		**40%: individual grades**	

➢ **GRADE INTERPRETATION & HONOR CODE**	
Your final course grade will be determined from a standard scale: **A** 93+ **A-** 90.0 - 92.9 **B+** 87.0 - 89.9 **B** 83.0 - 86.9 **B-** 80.0 - 82.9 **C+** 77 - 79.9 **C** 73 - 76.9 **C-** 70 - 72.9 **D+** 67 - 69.9 **D** 60 - 66.9 **F** <60	**ACADEMIC HONESTY** There will be clear communication if assignments are individual or group. For individual assignments, while I encourage collaboration, it is a violation of the honor code if a student duplicates work or obtains solutions from another student and submits it on their own. Please reference the honor code: http://honor.unc.edu.

➢ **MAJOR COURSE DUE DATES**	
Mid semester prototype	Thursday March 5
Final project due	Thursday April 16
QEP Research and Making Expo	TBD

I reserve to right to make changes to the syllabus, including project due dates and test dates (excluding the officially scheduled final examination), when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.