Product Design in the 21st Century
We are at an exciting time for Product Design, where there are both many opportunities and challenges. Rapid prototyping, 3D printing, miniaturized electronics, crowd source funding, and global marketing open up many opportunities. At the same time competition is worldwide, and successful products require both engineering and business success. In MAE 154 we will consider both of these aspects together. We will use the Lean Startup approach which emphasizes the importance of early feedback from customers. We will use this feedback to develop business models and engineering concepts to meet customer needs along with a plan for financial viability.

Objectives of MAE 154
The goal of the class is teach the product design process, and the best way to teach this is by actually going through the process of conceiving of a new product, building a prototype, and pitching the concept to successful entrepreneurs.
- Learning is the primary objective of the class, and it is not expected that every student project will lead to a new commercial product.
- But if we do not treat the project as a serious effort to develop a new product, we will not learn effectively.
- The skills learned in the class are how to integrate engineering and business considerations when developing a new product. These skills will be useful whether one works in a startup or established company.
- The more you put into the class, and the more you treat your project as a real opportunity to change the world, then the more you will learn from the class. You never know; a project may succeed beyond one’s wildest dreams, and unless one tries you cannot find out.

Key Milestones in Class
- Week 2: Each student presents 3 product idea concepts in class.
- Week 4: Each student presents a deeper dive into 1 of their concepts.
- Week 4: Students choose teams (team size ~4).
- Week 6: Preliminary Product Presentations by Teams
- Week 8: Minimal Viable Product Demonstrations
- Finals Week: Presentation to Outside Experts for VentureWell Sponsored $1,000 Team Awards

What Type of Product Ideas Are Suitable for MAE 154?
- You must have users and customers that you can interview about your design solution.
- Products may be with a for-profit or non-profit objective, but all products must have a viable plan for financial sustainability.
- It must be possible for a team of students to build a simple prototype. The product does not need to be finished within a quarter, but overly complex ideas should be avoided.
- Students must be willing to share their product concepts with the rest of the class. We ask that all students respect each other’s intellectual property. However, if your idea is so secretive that you cannot share it within a class setting, then choose another idea to work on in MAE 154.
- The prototypes can include, mechanical, electronic, and software components. This being a MAE class, solely software products are discouraged.
Tips for Coming Up with Product Ideas

- Find “pain points” and areas where improvements could be made.
- Ideas can come from your personal life, where you work, or from people you know.
- The more obscure the area, often the less competition, which is good for MAE 154.
- Make lists of pain points, without worrying about how to solve them (this will come later).
- Consider applying new technology to old problems (sensors, materials, computers, social networks, ...).
- Be creative in coming up with design solutions. Talk to classmates, consider wild ideas, focus on the core functions that need to be solved without restricting yourself to preconceived notions.

Tips for Selecting Product Ideas to Pursue Further

- Is the idea so compelling to users that they are willing to start using and pay for an unfinished product? Do you see their eyes dilate when you describe your idea?
- Is there a financial pathway to viability? Is there a niche group of early adapters that you would start selling to? The size of the market must be large enough for financial feasibility, but you do not need to conquer the world to have a successful product.
- Is there a technical pathway to viability? Can you build a simple prototype to prove the concept will work?
- Do not be too intimidated by competition as long as there is a difference between you and the competition. Often competition seems more formidable than it really is, and once you start building you may come up with breakthroughs.
- Can you convince classmates to work on the project with you? This is a true test of your presentation skills! You will need to be outgoing early in the class to engage with other students to get your ideas adopted.

Who Owns the Patents?

As students enrolled in a course, the university will not claim ownership for ideas you generate in the course or for use of lab facilities that are part of the course. See Hush Technologies (https://hush.technology/) as an example of an MAE154 team that went on to form a company and patents owned by them.

Approximate Grade Breakdown

- Individual Project Ideas 15%
- Class Participation 10%
- Midterm (covers reading & lecture material) 15%
- Intermediate Assignments 10%
- Team Project * 50%

* Each student will be rated by his or her teammates, which will weight the team grade.

Final: The class final will consist of oral presentations to a panel of entrepreneurs from the business community. This panel will select 3 winning teams to receive $1000 each from a Venturewell grant to further pursue their product concept.

Contact Information

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