The end game of my bioengineering class is to teach engineers how to make prototypes of medical devices like pacemakers. That one word has defined the entire course.

It’s essential that students consider the purpose of prototyping during a product development cycle. Prototypes can be used to test a concept or showcase a solution to a potential customer. Our prototyping process is not as well defined as a FDA Waterfall or Regulatory Pathway, but it is iterative and has some cool-sounding steps like alpha, beta, and gamma designs (See Figure 1, at right).

Envision sketching a paper and pencil version of a blood glucose meter: What does the display show the user? Where are the buttons? Does the test strip go? These questions are all informed by the user? Where are the buttons? Where does the blood glucose meter. What does the display show and gamma designs (Think tabletop, card, and dice). During the first week, teams select a category for their game design. By the end of the second week, teams have a prototype too soon, they become tied to their prototype. The game needs to be related to the medical field, address a current issue in the CDC's protocol for Ebola treatment, and prevent the spread of the disease. Often, if students develop a prototype too soon, they become tied to their prototype. The game needs to be related to the medical field, address a current issue in the CDC's protocol for Ebola treatment, and prevent the spread of the disease. Often, if students develop a prototype too soon, they become tied to their prototype. The game needs to be related to the medical field, address a current issue in the CDC's protocol for Ebola treatment, and prevent the spread of the disease.
How to Play

Through this semester-long course, students are able to play with process by completing these steps.

**Design Task #1: Team selection and product selection**
1. Form a team
2. Create a team contract
3. Research

**Design Task #2: Concept generation**
1. Build the concept
2. Choose and compare two products
3. Create two alternative designs

**Design Task #3: Verification**
1. Create a verification plan of predefined product specifications
2. Complete a Blue Ocean Diagram
3. Develop a survey to test the game

**Design Task #4: Verification**
1. Finalize specifications
2. Assess alpha
3. Provide metrics for specifications
4. Use survey to assess prototype
5. List three adaptations for beta
6. Write a bill of materials

**Design Task #5: Improve Beta**
1. Use other teams’ suggestions to improve beta
2. Finalize bill of materials, cost, and rules
3. Provide proof of verification (DOE)

**Design Task #6: Move into Gamma**
1. Analyze feedback, comments, and surveys
2. Document of gamma prototype
3. What would you add or change about your game?

**Design Task #7: Presentation**
1. Turn in product and digital work
2. Answer the following in 1-2 sentences:
   - Is the game fun?
   - Is it easy enough for the target audience to learn?
   - Does it take the right amount of time to play?
   - Are the rules clear and concise?
   - Does it have extra parts it doesn’t need?
   - How much do you think it should cost? Why???
   - Is your prototype easy to play if you are not present to give directions?
   - Does it have extra parts it doesn’t need?
   - What would you add or change about your game?
   - What other games are similar to it?
   - Is the game fun?
   - How much do you think it should cost? Why???
   - Is your prototype easy to play if you are not present to give directions?
   - Does it have extra parts it doesn’t need?
   - What would you add or change about your game?
   - What other games are similar to it?

**THE SEMESTER-LONG GAME LAB!**

- Use survey to assess prototype
- Provide metrics for specifications
- Document gamma prototype
- Finalize bill of materials, cost, and rules
- Write a bill of materials
- Provide proof of verification (DOE)
- List three adaptations for beta
- Improve specifications
- Complete a Blue Ocean Diagram
- Develop a survey to test the game