

Course Syllabus: Product Design

Professor David Robertson

OIDD 415 - MEAM 415 - IPD 515

Spring 2016

The goal of this course is to teach you the tools and techniques you need to develop physical products and many other types of innovations as well. We will do this through a mixture of lecture, course assignments, and in-class exercises. Over the span of this course we will go from idea to reality - from about 1000 rough ideas to a dozen finished product concepts with physical prototypes, cost models, marketing plans, pricing, and manufacturing plans.

The course web site contains all the topics, readings, and assignments for each course session. **With only a few exceptions, most assignments are due by 9am on the day of the session** unless a different date/time is given. Other preparation and readings are due by 3pm on the day of the session. Session topics and assignments may be adjusted during the semester, and new information may be added on a weekly basis. However, the overall plan for the course and project work will stay largely the same.

There is no final exam. Instead, we will have a Design Fair at the end of the semester. You're encouraged to invite your friends to this event.

Required Materials

Many of the required readings are from *Product Design and Development*, 5th edition (by Ulrich and Eppinger, McGraw Hill). You may buy this from Amazon or your favorite book seller. This book is denoted *U&E* on this website. If you would prefer to buy a used copy of a previous edition of the book, let me know. I can post .pdf files for the missing chapters.

The course will also use many innovation techniques that I've captured and published in PowerPoint form. I will post these to make them available to you. If you have an iPad, you can use the iPad app instead. It's free, and available at bit.ly/innovationtechniques.

Course Policies:

The policies below are intended to be fair and clear. Please send me an email if you have any concerns or questions.

Principles:

- Grading serves two pedagogical functions: students are much more likely to complete the readings, preparation questions, and project work if this work is graded. Students who prepare better, learn better.
- Grading provides an opportunity for us to provide you some feedback so you can reflect on what you did well and what you could have done better. Learning from this feedback is an important part of the course.

Make-Up Work

All deadlines are final and there is no way to make up missed work. This rule may seem inflexible, but it actually benefits all of us. While I hope you will complete everything on time, you are much better off strategically choosing to miss a date and cut your losses than trying to do something later. It only ends up creating a snowball effect. Please do not ask about making up missed work. The only exceptions are school closures, natural disasters, hospitalization or other serious medical emergencies documented by your physician or Penn health services, and advance notice of religious holiday observation. This is reflective of real innovation constraints - missing a market window (for example, missing Wal*Mart's Christmas toy delivery deadline) has significant penalties.

Class Participation

- Class participation is your responsibility. Prepare for class. Use your name card. Raise your hand.
- Students will be cold called in class sessions. Cold calling is random and inconsistent.
- Merely making yourself heard without demonstrating preparation, and thoughtfulness does not contribute to your class participation performance.

Attendance

- Attendance is a key part of the class experience. We all face various trade-offs in life, including the costs and benefits of attending this class. Although I appreciate your desire to be polite, you do not need to tell me in advance if you will miss class.
- Please do not ask me if it is ok if you miss class or leave class early. Both attending and missing class carry opportunity costs. Missing class is not "ok" in any absolute sense. However, attending class should probably not be as important to you as, for example, attending your wedding.

- Please do not ask me how to deal with your in-class responsibilities during an absence (e.g., forming a project team or giving a presentation). These tasks are your responsibility.

Intellectual Property

- Ideas submitted to Darwinator are assumed to be the property of the submitter. Students are expected to be respectful of the intellectual property of their classmates. Unless derived from sponsored research or other significant university-funded activities, the intellectual property created in this course is assumed to belong to the students who created it.
- Unless you draw up a mutually-agreed contract stating otherwise, ideas presented during the final class session are assumed to be the joint equally-shared property of the team members presenting them.

Session Topics:

Session 1:

- Introduction to the course
- Opportunity generation
- Your first innovation challenge

Session 2:

- Introduction to the innovation process
- In-class innovation exercise

Session 3:

- First innovation presentations

Session 4:

- Opportunity generation
- Innovation tournaments

Session 5:

- Opportunity pitches
- Creative idea generation

Session 6:

- User needs analysis
- Concept selection

Session 7:

- Solution pitches
- Team formation

Session 8:

- Manufacturing methods
- Prototyping exercise

Session 9:

- Prototype Pitches
- Product Costing

Session 10:

- Guest speaker
- IP and Patents

Session 11:

- Guest speaker
- Sustainable design

Session 12: team consulting

Session 13: Innovation management

Session 14: The Design Fair