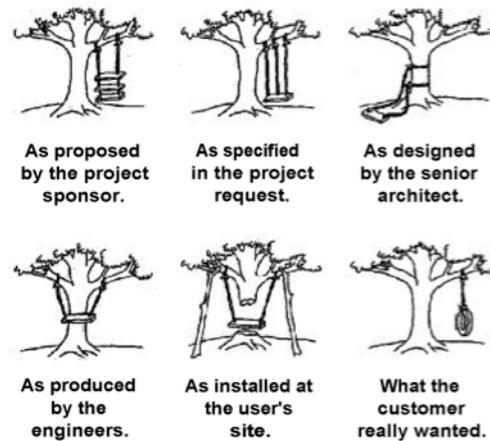


## Wellesley ENGR I I: Product Creation for All (Fall 2016) Syllabus

We will explore how products are created, including an exploration of ideation and brainstorming, reverse engineering, and the product development process. An emphasis will be placed on the role of human factors engineering, including usability successes and failures of specific products. Students will learn about these topics through two approaches:

1. disassembly and study of existing products and
2. creation of simple product prototypes for specific, local nonprofit organizations serving populations such as those with developmental or physical limitations.

By the end of the semester, students will be able to comprehend and independently apply both the product development process and specific human factors engineering approaches used in the design of many everyday objects; they will also have developed their own creativity and better understand how to further develop and apply that skill.



<http://www.effectiveeng.com/en-030619.htm>

### Course Objectives. By the end of the course, the students should be able to:

- Understand that creativity is a habit of mind that can be practiced, and have done so
- Use basic engineering design processes and tools to construct sketch models and physical prototypes
- Engage in reverse engineering product disassembly, including identifying common materials and manufacturing methods
- Understand and apply fundamental methods of human factors engineering
- Determine and specify customer needs effectively and respectfully
- Design and build simple prototypes in collaboration with local stakeholders

**Prerequisite:** Passing the basic skills component of the quantitative reasoning requirement.

**Course website:** coming soon!

## Course Staff

### Instructor

Amy Banzaert, Ph.D., Director of Engineering Studies & Lecturer  
SCI L001, [abanzaert@wellesley.edu](mailto:abanzaert@wellesley.edu)

Office hours: TBA next week

The best way to reach me outside of office hours is email; you can expect a response within one business day (this includes appointment requests).

I welcome meeting with you during office hours and by appointment/drop-in to help you with the class, offer advice about engineering, and similar topics. My door is always closed, but that's only because the Science Library is nearby and noisy. My blinds will be closed if I would prefer not to be disturbed; otherwise, knock and enter.

**Larry Knowles**, machinist

SCI L023, lknowles@wellesley.edu

Hours: 7:30-4:30, Tuesday, Wednesday, & Friday

**Thessaly McFall**, We-Lab studio assistant

SCI L024, tmcfall@wellesley.edu

Hours: may vary week to week, see [We-Lab Calendar](#), look for Thessaly's office hours.

## Course Policies

### Attendance and Responsibility

Class attendance is required, due to the hands-on nature of the class. If you must miss a class for a legitimate reason, inform Amy and your lab partners as early as possible so that we can plan appropriately and provide you with makeup materials. Your grade will suffer if you are absent without good reason. You are expected to come to class on time and should also check the course website and your email frequently as part of your responsibilities for the class.

If the course schedule and due dates cause you difficulty in observing any religious holiday, please talk to Amy about making alternate arrangements well in advance.

All course work is covered by the Wellesley College honor code "As a Wellesley College student, I will act with honesty, integrity, and respect."

### Grading

This class is mandatory credit/non, with the expectation that you will focus on learning and engaging with the materials and activities without the pressure a grade can create, especially in what is likely to be a new area of learning. You are still expected to attend class regularly, be on time, and contribute meaningfully in class and on projects. You should expect to spend about 11 hours per week on this class (if you are spending far more or less than that, please let me know). If your work is not minimally satisfactory, credit will not be given.

### Safety

In this class, you will learn how to use pieces of equipment that are potentially dangerous to you and your classmates if not used properly. Many are also expensive to repair if you break them. You are not allowed to use these pieces of equipment without direct supervision by an instructor or TA unless you have been explicitly certified to use them by an instructor.

You should come to class dressed appropriately for hands-on work: avoid wearing loose clothing or dangling jewelry; pull back long hair into a ponytail or bun; and wear comfortable clothing and closed toed shoes.

You must acquire safety glasses by the second day of class, and bring them to all course meetings and whenever you work in the lab. Be sure to label them with your name. There are many pairs of safety glasses available from past classes that you can "adopt." Alternatively, you can purchase a new pair from the campus bookstore.

**Collaboration Policy**

Frequently, you will work on projects in pairs or groups. You are strongly encouraged to change partners for each new project.

Although you are working with a partner it is essential that you each maintain your own design blog. There will be certain deliverables for each project that can be submitted jointly and others that need to be submitted individually. Details will be specified with each project assignment.

**Diversity & Inclusion**

All enrolled students are welcome in my classroom. I expect and embrace different ways of thinking, living, being, working, and learning. If you have questions or concerns, please speak up in class or let me know individually. <http://www.wellesley.edu/about/diversityandinclusion/about>

**Disabilities**

Students with disabilities who are taking this course and who need disability-related accommodations should talk to Amy Banzaert to make appropriate arrangements. These students are also encouraged to work with Jim Wice, the Director of Disability Services. Jim's office is located in the Pforzheimer Learning & Teaching Center on the third floor of Clapp Library. If you have a physical disability or a learning disability, Jim is the person to see to arrange for accommodations. If your learning disability is undocumented or if you are uncertain as to whether you have an actual disability, Jim can arrange for you to be tested. <http://www.wellesley.edu/disability>

## Tentative Schedule

Note: the nature of project-based work is that some schedule shifting is required. Expect this schedule to change as the course progresses. Changes will be documented on the course website.

F	2-Sep	Jump into product design & creativity
W	7-Sep	Product design & creativity
F	9-Sep	Small-scale manufacturing: drill press, band saw, belt sander
W	14-Sep	Reverse engineering & how it's made
F	16-Sep	Project introduction & customer considerations
W	21-Sep	Disability awareness, basic ergonomics & associated physics
F	23-Sep	CRI Visit?
W	28-Sep	Reflect on trip: review product design process; brainstorm projects; team dynamics
F	30-Sep	No Classes - Inauguration!
W	5-Oct	Form teams; lecture & practice on design specifications; brainstorming & background research
F	7-Oct	Small-Scale Manufacturing: 3d printer; project work: 3 ideas
W	12-Oct	Small-Scale Manufacturing: laser cutter; project work; <b>Design Review: gallery walk</b>
F	14-Oct	mid-semester feedback form
W	19-Oct	<b>Design review: sketch models</b>
F	21-Oct	project experimentation & construction
W	26-Oct	<b>Key functional prototype</b>
F	28-Oct	Refine prototype
W	2-Nov	<b>Initial working prototype</b>
F	4-Nov	Refine prototype
W	9-Nov	<b>Design review: second working prototype</b>
F	11-Nov	Refine prototype
W	16-Nov	<b>Design Review: final prototype</b>
F	18-Nov	Documentation (& refine prototype if needed)
W	23-Nov	Thanksgiving Break
F	25-Nov	Thanksgiving Break
W	30-Nov	<b>Project delivery</b>
F	2-Dec	Project reflection & refinement & <b>final poster draft due</b>
W	7-Dec	Project reflection & refinement & <b>final documentation due v1</b>
F	9-Dec	<b>Final exhibition</b> & class reflection & clean up
M	19-Dec	<b>Final documentation due v2</b>