

Introduction to Product Prototyping – Silicon Valley

GE2030-Summer 2020
College of Engineering
Northeastern University

Instructor: Dr. Bala Maheswaran
E-mail: b.maheswaran@northeastern.edu
mahes@coe.neu.edu
Class Hours: M, Tu, W, Th 1- 3 pm
Room: NU Campus at Silicon Valley (Online)
Office Hours: By appointment (online)

Course Description

Seeks to develop in-depth knowledge and experience in prototyping by focusing on engineering processes and instrumentation that are used in different industries. Studies the prototyping cycle, from initial process flow and sketching to prototype development to testing and analysis, with an emphasis on iteration. Analyzes how different kinds of engineering prototypes can address design and user-interface needs vs. functional needs, such as looks-like and works-like prototypes. Offers students an opportunity to obtain operating knowledge of methods including 3D printing, SolidWorks, off-the-shelf hardware-software interfaces, simulation, embedded systems, product testing, prototype analysis, and prototype iteration.

Learning outcomes

Students should be able to:

- state the prototyping cycle and apply it to iteratively create products
- learn about user and technical testing methods for prototypes
- advance through multiple iterations of the design cycle from an idea to testable prototype
- understand human-centered design approaches to product design
- use digital fabrication techniques to quickly create prototypes

Textbooks

There is no required textbook for this course. During the course there will be required readings which are mostly online or freely available. If you would like to get a textbook for a specific topic there will be recommendations available. There is an expectation that students in this course will seek out their own information and tutorials on some topics. Recommendations can be provided by request.

Materials

Due to the assignments and requirements of this course, *students will be required to get materials and hardware for their own projects*. There will be basic materials available and proper lead time will be given for the procurement of any needed items.

Assignments:

Discussion and collaboration is strongly encouraged both in class and during assignment preparation. In each case the individual author or the assigned team will take full responsibility for the final conclusions and presentation of the results.

Grading:

Projects and Activities:	60%
Final Team Project:	30%
Participation and Attendance:	10%

Class Participation and Attendance:

Lectures in this course will be interactive and you are strongly encouraged to speak up when you have a question or would like to make a comment. You should also expect to be called on any time to answer questions. Making the arguable statement and being able to defend your position is more important than being “right” as far as the discussion is relevant to the subject.

Your attendance in class directly impacts your ability to participate and benefit from these discussions, especially because there is not a single textbook to follow. By signing up for this course, you express your interest in learning about product development, so it is up to you to show up for class on time and take full advantage of this learning and enrichment experience.

SYLLABUS: Summer1-2020 (five weeks)

Week	Topics	Assignments/Activities
1 May 4-8	Course Intro Design Philosophy & Process Paper Prototyping Personas Specifications Types of Prototypes	P1: Graphics Assignment: Assignments Due: May 6, 2020 P2: Paper prototype: Silicon Valley Product Demo/Presentation Due: May 8, 2020
2 May 11-15	CAD 3D Printing Laser Cutting	P3: Product Prototype: Advancement Presentation/Report Due: May 13, 2020 P4: Reverse Engineering: Silicon Valley product Presentation/Report Due: May 15, 2020
3 May 18-22	Design Analysis Humans Hardware Debugging Hardware. Final Project Intro	P5: Prototype: Design/Build Demo/Presentation/Report Due: May 20, 2020 P6: Rapid Prototype: Sensors Based Demo/Presentation/Report Due: May 22, 2020
4 May 25-29	Ideation Value Sensitive Design Manufacturing Implementation	Building Final Project prototype
5 June 1-5	Final Testing Final Presentations Final Documentation	Final Project: New Product Demo due: June 1, 2020