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.
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<tr>
<th>Week</th>
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| 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 |