



Prototyping and 3D Printing 5-6 Syllabus

Course Goals

1 Learn Design Process

Students learn how to visualize conceptual objects and make them a reality using Tinkercad and 3D printing software.

2 Replicate Designs

Students replicate predetermined designs to familiarize themselves with software. Eventually students use their creativity to modify and improve upon these designs.

3 Create New Prototypes

Students demonstrate proficiency with replicating and modifying designs, then they move on to create completely new objects of their own and bring them into the world through 3D printing.

Course Topics

1 Why 3D Printing?

Students learn what makes 3D printing special, and when to use 3D printing vs. alternative options.

2 Printing Process

Students familiarize themselves with the 3D printing process and how it works.

3 Design Process

Students learn how to visualize and plan projects before getting started, so they can be more efficient.

4 Learn the Software

Students spend several days familiarizing themselves with several software programs and combining them to accomplish tasks.

5 Prototyping

Students put all their knowledge together to design and 3D print prototypes for design challenges.

6 Free Design

Students design and print whatever object they would like to take home.

7 3D Scanning

Students use Makerbot Digitizer to scan an object into a 3D design software. Students clean up the scanned file with Autodesk Meshmixer.

Course Schedule

Day 1

Introductory Topics

Students learn class rules and objectives, and discuss why this course is relevant.

Pros and Cons of 3D Printing

Students discuss when 3D printing should be used.

3D Printing Background

Students learn about how 3D printing works and general background about the technology. Students are also introduced to the design challenges they will work on throughout the course.

Exercises with MakerBot Print

Students use exercises with MakerBot Print to familiarize themselves with the program and its ability to export files to the 3D printer.

Thingiverse Diorama

Students import files from Thingiverse and make a diorama-esque scene, with an emphasis on creativity in design.

Day 2

Tinkercad Lessons

Students use lessons on Tinkercad to familiarize themselves with 3D design.

Day 3

Tinkercad Lessons

Students use lessons on Tinkercad to familiarize themselves with 3D design.

Rocket Ship Design

Students design and print their own Rocket Ship.

Day 4

Tinkercad Projects

Students work on Tinkercad Projects. These are more advanced than the Tinkercad Lessons.

Avenger Superheroes

Students design and print a superhero.

Day 5

Tinkercad Projects

Students work on Tinkercad Projects. These are more advanced than the Tinkercad Lessons.

Prototyping an Invention

Students gain free reign to create whatever they please with no constraints.

Day 6

Scanning Objects

Students scan and modify an object of their choosing.

Day 7

Bridge Building Competition

Students design, print, and test their own bridges.

Day 8

Design Challenge

Students work in groups to design, print, test, and iterate a solution to their design challenged picked out on the first day.

Day 9

Problem Solving with 3D Printing

Students brainstorm and design solutions to household problems using 3D Design and 3D Printing.

Prototyping an Invention

Students gain free reign to create whatever they please with no constraints.

Day 10

Prototyping an Invention

Students gain free reign to create whatever they please with no constraints.

Film

Students watch a documentary about 3D printing while final projects print.

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Updated on 3/20/2019