

## Engineering & Innovation



### Program Highlights

- Develop 3D solutions to design challenges to learn the fundamentals behind mechanical, civil, and biomedical engineering
- Manufacture an artificial limb to replicate natural function and movement in real world situations
- Design and build a scale model structure compliant with code, zoning, and budget requirements
- Learn from professionals in the field about the latest advancements in engineering and technology

### Campus Locations

#### Yale University

- July 7 - July 19, 2019

#### UC Berkeley

- June 23-July 5, 2019
- July 7-July 19, 2019
- July 21-August 2, 2019

### Academic Program Overview

The goal of the program is to give students a taste of multiple types of engineering. In the first six classes, students will spend two days focused on each of the following fields of engineering: biomedical, civil, and mechanical. For each sub-field of engineering, students will learn some key concepts and complete at least one design challenge.

For the last three classes, each student (or team of students) chooses the field of engineering that interests them most and does a larger project or design challenge focused on that area. In past years, students have used Autodesk software packages such as Revit, Inventor, and AutoCAD. Instructors will have the freedom to choose the software they are most comfortable using. Students use a free trial of the software during the program.

By using an experiential learning approach, students will quickly engage in these topics, and the instructor introduces the underlying theory and concepts as students tackle these issues while designing and creating their prototypes.



### Guest Speakers & Excursions

Last summer, guest speakers included Vice President of a major engineering and architecture firm and Guest Presenter Kathryn Gagnon, the Project Engineer for Lagan. Previous excursions included a visit to industrial engineering firm Stantec where Students spent time reviewing “pull schedules” that allow the orchestra of fields to come together to create a masterpiece – the new UCSF cancer center.

### Instructors

Courses are taught by accomplished and passionate faculty recruited from many area colleges, universities and professional forums. Each faculty member is selected for their subject area expertise and proven ability to both challenge and captivate students.

### Curriculum Advisor - Jeffrey Copperthite, M.Ed

Curriculum Advisor - While instructors vary each year, the Curriculum Advisors ensure continuity in our curriculum. This course was designed by Jeffrey Copperthite to introduce students to foundational principles of engineering. Because students work in teams, there are no math prerequisite courses. Students will be assigned to teams while taking into account each student’s math ability. He holds an M.Ed and is PLTW certified in five engineering courses.

### Sample Schedule from Past Year

*This is only to provide a general idea of the class structure. The exact sequence of lessons will change based on availability of guest speakers and on companies that can host our students.*

Class is held from 9am to 12pm, Monday through Friday.

#### Day 1. Monday

- Class expectations
- Product improvement exercise
- Challenge #1: Cable car build
- Software installation and test period

#### Day 2. Tuesday

- Reverse engineering overview
- Student item analysis
- Challenge #2: Ping pong trick shot
- Autodesk Inventor check-in

#### Day 3. Wednesday

- Intro to Autodesk modeling
- Autodesk modeling skills
- Begin modeling reverse engineering items

#### Day 4. Thursday

- Continue modeling reverse engineering items
- Learn assembly techniques in Autodesk
- Review project outcomes and presentation expectations for tomorrow

#### Day 5. Friday

- Finalize reverse engineering product
- Create presentation on proposed improvements
- Present projects (gallery walk style)
- Challenge #3: Paper bridge

#### Day 6. Monday

- Confirm installation of Autodesk Revit
- Wood framing tutorial
- Creation of shed in Autodesk Revit OR roof construction project

#### Day 7. Tuesday

- Understanding residential construction and observing “common” items in a house
- Review Habitat for Humanity Housing code
- Begin planning for house project – Client interview, bubble diagrams, and floor plan drafts to be completed

#### Day 8. Wednesday

- Build scale models of houses via foam core and cardboard.
- Confirm they meet code requirements
- Model houses in Autodesk Revit

#### Day 9. Thursday

- Present residences and give tours along with floor plan drawings and how specific items of residential code were followed.
- End of course survey, feedback, and end of academic track

## Tuition

- **Residential Students:** \$4,998
  - Includes: all meals, lodging, excursions, academic program, weekend excursions
  - Excludes: optional airport pickup and drop off service (available for an additional fee)
  
- **Commuter Students:** \$2,498
  - Includes: academic program, excursions, programming from 9am to 5pm, Monday-Friday
  - Excludes: lodging, meals (lunch plan available for \$200), weekend excursions
  
- **Extended Commuter Students:** \$3,398
  - Includes: lunch, dinner, excursions, academic program, programming from 9am to 8pm, weekend excursions
  - Excludes: breakfast, lodging