

## **Carnegie Mellon University School of Art**

**Course:** 60130 - 3D Media Studio I1 (Hey Robot, Let's Make Something) Section D2

**Times:** T/TH 6.30pm/9.20pm

**Location:** Dougherty Hall D200, CFA 317 Computing Cluster

**Facilities:** [CMU ArtFab](#) Doherty Hall (C200, D200, D315)

[Digital Arts Studio](#) @ Dougherty Hall

**Contacts:** Instructor: Steve Gurysh (sgurysh@andrew.cmu.edu)

### **SYNOPSIS OF CLASS**

This seven-week mini has three goals:

1. Expose students to the canonic and experimental repertoire and techniques of digital fabrication
2. Familiarize students with the digital fabrication facilities available at Carnegie Mellon
3. Develop proficiency in digital-physical workflow involving a versatile CAD environment (i.e. Rhino3d, RhinoCam, Pepakura, Grasshopper, Illustrator) and four CNC fabrication machines (laser cutter, vinyl cutter, CNC router, 3D printer).

The course begins with an intensive boot-camp in Rhino3d, followed by fabrication assignments for each machine. The assignments will encompass standard building/fastening techniques suited to each machine (i.e. perforation folding, joinery, waffling, etc), as well as conceptual associations and interpretations of digital fabrication in contemporary art.

### **LEARNING OUTCOMES**

Upon successful completion of this course, students will:

- Gain familiarity with the repertoire of artists, designers, works and activities around digital fabrication and sculpture
- Learn when to employ digital fabrication in a project and when not to
- Learn how to work in a shared facility with rules, responsibilities, roles and ethics
- Learn how to execute a project iteratively from prototype to final work
- Learn how to document and present creative work in person and online
- Learn how to help others effectively in design/fabrication assembly of sculpture
- Gain better intuition about materials and how they look, feel, sound and smell as they are being worked

### **ESSENTIAL SKILLS**

- how/when to use a hammer/rubber mallet
- how/when to use power drills and impact drivers
- how/when to use a variety of clamps
- how/when to use hand and power sanding
- how/when to use a palm router
- how/when to use hand saws and chisels
- how/when to use a table saw, miter saw, and panel saw

- how to understand the differences between a variety of drill and router bits
- how to understand the varying qualities and standard dimensions of plastics, woods, and composite materials
- how to make measurements with a ruler, tape measure, and caliper
- how to select and use hardware and fasteners
- how to use laser and bubble levels
- how to orient objects in both real and 3D rendered environments
- how to light sculpture effectively
- how to design, fabricate and assemble joinery
- how to make jigs, modify tool set ups, and use tools inventively
- how to how to model a complex object with CAD
- how to create tools paths for fabrication with a CNC router
- how to move around files for design and fabrication in different locations
- how to develop workflow from one tool to the next in a shop environment
- how to troubleshoot and understand why a tool, material, or process is not behaving as intended
- how to apply paints and finishes
- how to work in a spray booth
- how to keep a clean workspace
- how to use proper safety equipment
- how to order and source materials locally and online
- how to become familiar with the digi-fab facilities and resources available across campus

## **COURSE ADMINISTRATION**

Class and laboratory hours for this course are complimented with a number of web-based communication and documentation tools including email, Blackboard, and a [class blog](#). Students are required to familiarize themselves with these systems, closely follow correspondences and contribute to discussions and documentation efforts. Specifically, students must document all class projects with the specifications provided by the instructor (i.e. using text, photos, and accompanying digital files).

## **SEMESTER OVERVIEW**

Some facts:

- This mini-course is offered over the course of seven weeks, i.e. half-semester
- The basic layout has FOUR sections:
  - a. TWO weeks of computer-aided-design (CAD) training
  - b. ONE weeks of making with Laser Cutter
  - c. ONE week of CAD + Hand Router
  - d. TWO weeks of making with CNC-Router
  - e. ONE week of final project

- There is an assignment due each week on Monday. That makes for SEVEN assignments in total. Late assignments are *never* accepted without official excuse.
- The basic arrangement of class times is lectures/demos/critiques on Tuesdays, followed by work sessions on Thursdays.

A overview of the course material over the seven week period:

- Week 1: Rhino Basics
- Week 2: Rhino Advanced
- Week 3: Laser Cutter
- Week 4: Hand Router basics
- Week 5: CNC Router Basics
- Week 6: CNC Router Advanced
- Week 7: Final Project

### **CLASS TIME**

Students are required to be attentive, active and fully *present* during class time. *Text message, phone calls, emails, facebook and other forms of digital social networking will result in an absentee mark for the day.*

### **ATTENDANCE**

Consistent attendance is mandatory. Students are allowed *two* unexcused absences; further unexcused absences will lower your grade for the session by one letter for each additional absence. Attendance will be taken at the beginning of class. If you arrive more than 15 minutes into the class period, you will be marked as absent for the day. Three late arrivals of more than 5 minutes will amount to an absentee.

If you have a class or work schedule issue & anticipate being somewhat later on a regular basis, please see the instructor during the first week of the semester.

### **PARTICIPATION**

Students are required to participate in every aspect of class activity, during class time and online through the course blog; please see the grading section below for details. Students are required to make at least *one post onto the blog for each class* (a total of 14 posts); these posts should convey the student's research process, reveal what stages of the project occupies him/her, and trigger further discussion and interaction. These posts can take shape in references to existing artists whose work relate to the class theme, references to existing works that address *the miniature* or *interactive art*, references to other courses addressing our topics of interest, references to relevant existing tools/technologies. Every post should contain at least one paragraph of prose that describes the author's interest in the subject matter and how it relates to class topics and projects.

### **CRITIQUES**

Critiques occur on Tuesdays and their attendance is essential. Failure to attend will impact

both your class participation grade and your project grade. On critique days, all students are expected to be set-up & ready to participate at the beginning of the class period. Ci

## GRADING

Your final grade is calculated based entirely on your contributions to the class blog.

Accordingly, the following markers of your participation and contribution to the course must all be posted to the blog:

- documentation of completed assignments and projects
- documentation of in-progress works
- references and records of your research for each assignment
- references to artists, designers, engineers, articles or anything else on the web that's relevant to the subject matter of the course and potentially helpful to you or your classmates

The **final grade** for the course will be calculated based on the following formula:

Attendance:	mandatory ( > 2 absences reduces your grade)
Class participation:	20%
Five Weekly assignments	50% (10% each)
Last Assignment:	30%

Class participation makes up 20% of the final grade; This portion of your grade is calculated based on your presence and attentiveness in class, as well as your contributions to class discussions and class-web-site references and discussions.

Each assignment counts as 10% of your final grade is based on two considerations:

- Concept (originality, rigor, depth of research...)
- Execution (effort, craft, attention to detail, ...)

Concept and Execution are each graded on a scale of 0 to 2 (integers only); the scores for concept and execution are averaged and rounded up to give your final grade for each assignment. The scale of 0 to 2 indicates:

- 0: incomplete, insufficient, inadequate
- 1: satisfactory
- 2: outstanding

The last assignment makes up %20 of your final grade; this assignment must be either an integrative project (drawing from concepts or techniques you used in your previous assignments) or iterative project (re-make and improve a past assignment). Students are encouraged to begin thinking about the final assignment as early as possible as it aims to help you synthesize the numerous concepts and techniques covered in the entire class.