



SPRING 2011

# BUILDING 3D FABRICATORS

T.H 0330-0615PM CRN 35208 ROOM 192

## BRIAN EVANS

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O ART 187F

H T.H 1230-0300PM



### COURSE DESCRIPTION

This course introduces DIY digital fabrication through three-dimensional modeling and rapid prototyping technologies for the incorporation into works of art and design. Through the construction of a commercially available open source 3D fabricator, this course addresses issues surrounding open source manufacturing and topics including data acquisition, modeling, visualization, modularity, and material practices.

### COURSE OBJECTIVES

- Demonstrate a range of techniques using digital 3D modeling and rapid prototyping technologies for incorporation into works of art and design.
- Experiment with new technologies for use in a productive studio practice.
- Criticize artwork through the evaluation and discussion of conceptual and visual elements.
- Discuss the role of open source practices and their place in the fields of art and design.
- Critically evaluate the theoretical and technical aspects of 3D data acquisition, modeling, and visualization within a contemporary art context.

### MATERIALS

Our primary material this semester will be 3mm diameter ABS filament—the same basic type of plastic Lego's are made from. Some ABS will be provided for general printing and calibration however students are encouraged to purchase their own plastic in whatever color from <http://store.makerbot.com>. In addition, students will have to purchase whatever other materials are necessary for the completion of their projects and are also required to have a folder or binder for handouts and a decent sketchbook to take notes, layout project ideas, and to sketch in.

### COURSE REQUIREMENTS

Build Participation	30 pts	Assignments	30 pts
Final Project	40 pts	<b>Total</b>	<b>100 pts</b>

### BUILD PARTICIPATION

The building, testing, and calibration of, as well as finally learning to operate our 3d fabricator will consume nearly a third of the semester. The class will be divided into three teams—mechanical, electronics, and software—each responsible for various aspects of the build process. Full participation and cooperation with your team and the rest of the class is necessary for the productive and successful completion of the build process. At the conclusion of the build process, you will be evaluated by both your fellow team members and the instructor and will be rewarded with up to 30 points towards your final grade for exemplary participation throughout the build process.

### ASSIGNMENTS

There will be a total of three deadlines, or assignments, due between the completion of the build period and the final critique each worth up to 10 points towards your final grade. Grading of each assignment will range from completion to a high degree and thought, average completion, and not completed. These include the following:

- **03.01.11 Printed Found Object:** Find and print an object of your choosing from <http://www.thingiverse.com>. The object should be cleaned and/or assembled for the critique.
- **03.08.11 Project Proposal:** Bring to class for critique a visual proposal for the final project to include annotated sketches, basic renders, sample prints, sample materials, or other components as needed.
- **04.12.11 In-Progress Critique:** Present significant progress towards your final project including renders, test prints, fabricated components, or other work-in-progress. Feedback will be provided at this point.

## FINAL PROJECT

The final project represents the largest component of this class and as such should be finished to a high degree of competency, complexity, finish, and professionalism. The content, size, or materials required are open however this project should incorporate technologies learned in this class in some way. Options include, but are not limited to: assembling a composite object from multiple smaller printed objects, using printed components in a larger object made of other materials, making molds of printed objects and casting in other materials, or creating an installation of a series of objects related by a common theme or system. **DUE: 05.05.11.**

## GRADING CRITERIA

Grading for the final project will consider the nebulous web of the following criteria:

- Extent to which the work presents a creative and compelling solution to the considerations of the assignment.
- Demonstrates engagement with both concept and form and the degree to which the work is innovative and original.
- Evidence of play, experimentation, and the willingness to work beyond the confines of the assignment.
- Represents a high degree of completion, with a fully executed idea and a professional level of installation and presentation.

## GRADING STANDARDS

### **A 90-100% Exceptional**

Represents the highest degree of completion and fully embraces or exceeds all of the above grading criteria.

### **B 80-89% Very Good**

Represents a competent solution to the project and engages a majority of the above grading criteria.

### **C 70-79% Average**

Addresses the minimum requirements of the assignment and an average degree of the above grading criteria.

### **D 60-69% Below Average**

Partially addresses the requirements of the assignment and a small degree of the above grading criteria.

### **F 0-59% Unacceptable**

Shows little understanding of the project requirements and little to no degree of the above grading criteria.

## ONLINE GRADING

I will use the secure online grade book Engrade to post grades, attendance, and due dates. Engrade is available to students 24/7 by signing up for a free account at: <http://www.engage.com/students> using the access code provided during the second week of classes. It is the students' responsibility to track their attendance and progress in this course online as no other grade information will be provided.

## ATTENDANCE

A routine working schedule is important to a healthy and productive studio practice. If you miss class, you are losing valuable work time, missing important information from your instructor or peers, and denying your fellow students your input. As such, attendance is absolutely mandatory. Where this is not possible the following applies:

- The fourth absence from the class results in a 10%, or one letter grade deduction from the final grade.
- The seventh absence automatically results in the student failing the class.
- There is no distinction between excused or unexcused absences.
- Failure to attend a critique, even if your work has already been discussed, will result in the loss of one letter grade for that project.
- Failure to participate in the final studio cleanup at the end of the semester results in a 5% deduction from the final grade.
- Working from home or using class time to gather materials are not grounds for exception of this policy.

## LATE PROJECTS

Any project not fully completed and presented at the beginning of class on the date due will be considered late and will not be critiqued in class. Late projects or essays will automatically be reduced a full letter grade and must be turned in within 2 class periods of the due date to be considered. Any project not turned in within this time, or projects not turned in for the final critique, will automatically receive a 0 grade for that requirement. Re-do's will not be considered so please turn in the best project possible when it is due!

## STUDIO TIME

The nature of this studio course requires that students should expect to spend an additional 3-6 hours minimum in the studio working on their projects every week. Studio hours will be posted by the second or third week of

classes—expect hours mostly during the weekends. Working during another class is strictly not permitted. Do not ask other instructors for exceptions to the posted studio hours. When coming in outside of class, please be sure to sign in with the lab monitor and follow all posted guidelines. **Please note:** you will be given access to the cabinet containing our fabricator and workstation, as well as various tools specifically for this class. **Please do not, under any circumstances, leave this cabinet open or unlocked while unattended.** Failure to secure the cabinet after use will result in a warning, reduction in the semester's grade, or lose of access for the entire class.

## SAFETY AND RESPONSIBILITY

In this course the student may make use of tools that if used improperly could cause injury. Please work intelligently, safely, and follow these guidelines:

- Use only those tools for which you have been instructed to use by the instructor on record for this course and never use a tool that is dysfunctional in anyway.
- Always ask if unsure of any proper operational procedure or when attempting unique tasks for which you have no prior experience.
- Work smart, pace yourself, and be aware of those around you at all times.
- You are not permitted to work in the studio after drinking, taking drugs (prescription or otherwise), not sleeping, or otherwise being impaired.
- The student code of conduct will be strictly enforced by the Department of Art in all matters of safety and responsibility.

## APPROXIMATE TIMELINE

- 1 01.18 First day introduction, syllabus, orientation, Cartesian robots, team assignments.  
01.20 Eggbot workshop and print-a-thon, team discussion and organization.
- 2 01.25 Tasks assigned to teams, divvy materials, begin build process.  
01.27 Continue build process.
- 3 02.01 Team status reports and summaries, continue work.  
02.03 Continue build process.
- 4 02.08 Team status reports and summaries, finalize build process.  
02.10 Complete build process, begin testing and calibration.
- 5 02.15 Continue testing and calibration.  
02.17 Finalize testing and calibration, begin test prints.
- 6 02.22 Continue test prints, work on first assignment.  
02.24 Continue test prints, work on first assignment.
- 7 03.01 ASSIGNMENT 1 DUE: PRINTED FOUND OBJECT – 10pts.  
03.03 Intro to Sketchup, team evaluations.
- 8 03.08 ASSIGNMENT 2 DUE: FINAL PROJECT PROPOSAL – 10pts.  
03.10 Sketchup vs Blender.
- 9 03.15 More Blender.  
03.17 Mid-term meetings.  
03.22 SPRING BREAK – NO CLASSES.  
03.24 SPRING BREAK – NO CLASSES.
- 10 03.29 Mold making and casting workshop.  
03.31 ABS finishing workshop.
- 11 04.05 Assembly tips and tricks.  
04.07 Final push for third assignment.
- 12 04.12 ASSIGNMENT 3 DUE: IN-PROGRESS CRITIQUE – 10pts.  
04.14 TBD.
- 13 04.19 TBD.  
04.21 TBD.
- 14 04.26 TBD.  
04.28 TBD.
- 15 05.03 TBD.  
05.05 CRITIQUE: FINAL PROJECT – 40pts.
- 16 05.10 Studio clean-up day (-5% from final grade if late or absent this day).

*All dates are approximate only and subject to change.*



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## LETTER OF UNDERSTANDING

By signing below, I affirm that I have read the attached syllabus and understand the policies and requirements for ART 39AS Building 3D Fabricators, taught by Professor Brian Evans in the Spring 2011 semester. In addition, I have read and understand the deadlines, policies, and responsibilities as outlined in the Art Department Syllabus Policies and the Student Conduct Code in the Student Handbook. I further acknowledge that should a dispute arise regarding the content of the attached syllabus, the issue of my notification in advance of course requirements and policies has hereby been disclosed.

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Name

900#

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Signature

Date