Robotic Fabricates – Folded Metal Structures (ARCH-4833-SSB/ ARCH-8833-SSB)

Spring 2017 – MW (11:35 – 12:55) at Digital Fabrication Lab

Instructors:

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Outline:

This seminar foregrounds research into the application of experimental design techniques with material constraints using robotic fabrication methods. Merging two seminar courses, *Introduction to Robotic Fabrication* and *Fabricate*, the new *Robotic Fabricates* seminar focuses on the robotic sheet metal folding methods, for which the students will investigate the creative integration of design logic, material constraints, fabrication method, and assembly solutions. The operation of designing and the operation of making are seen as intertwined, and students will develop a methodology for embedding their design logic into crafting artefacts.

Course Objectives:

The seminar provides a specific introduction to methods of robotic fabrication in order to foster a better understanding of how digital methods apply to design by exploring possibilities and limitations of different techniques. Students will advance their knowledge in digital design by acquiring software skills in parametric modeling and in technologies that allow fabricating the digitally conceived design.

Students will work at the Digital Fabrication Lab and utilize the KUKA robotic arm to create intricate artefacts of digital craft. Students will learn to program the robot to move, create custom tools for use with the robot, understand the capabilities and constraints of working with this tool, and how to integrate this knowledge in their designs. Sheet metal has been selected as the material of fabrication due to its wide range of applications in architecture and manufacturing industries. Using industrial robot, parts with complex three-dimensional geometries can be folded from a single planar sheet of metal without stretching, tearing or cutting. Other machinery such as the water jet cutter or the CNC router might be used to prepare or finish components fabricated through robotic manufacturing.

Course Methodology:

The course has three main components: a) learning advanced skills in parametric modeling, b) Kuka robot control and programming for fabrication, and c) the development of material systems and the exploration of digital techniques for the design of complex, non-standard components for the fabrication of a large scale prototype.

The first and second components are skill-oriented and consists of weekly lectures followed by in-class activities and assignments. The third component is research oriented and project based.