PARAMETRIC DESIGN
VISUAL PROGRAMMING WITH GRASSHOPPER
Arch 4833 / Arch 6507 DB
Fall 2017, Tu + Th 1:30 pm – 2:45 pm
Instructor: Assoc. Prof. Daniel Baerlecken

Pre-requisites
Modeling and Media II and Modeling and Media III

Course Description
Parametric modeling, scripting and advanced fabrication technologies have become an integral part of contemporary architectural practice, in which architects use an amalgam of mixed skills reaching out to other disciplines such as computing, engineering, art and design. This class teaches techniques in parametric modeling and explores digital tools as design instruments for architectural design with main emphasis on facades and structural systems.

Course Objectives
The class introduces parametric modeling and design. The software introduction builds the necessary skills to address technical challenges in order to inform design strategies in form generation and optimization/fabrication using Grasshopper. Grasshopper integrates with Rhinoceros. It operates as extensions of the existing platform (Rhinoceros) allowing to integrate and explore its algorithmic potential. Visual programming allows for a more intuitive design exploration than text based programming.

Students will gain knowledge in visual programming including the following categories: Interface/Components/Parameters/Data Management, Scalar Component Types, Operators Conditional Statements, Range / Series / Interval, Functions, Lists, Weaving Data, Shifting Data, Export to Excel, Vectors, Attractor, Curves, Surface Structuring, Families with Sequences, Ranges, Lines and Grids, Nested Lists and Basic Data Management, Fabrication tools, Catenary, Mesh based tools, Solar Analysis, Lunchbox, Conditionals, Functions.

In the second half of the semester, we will analyze and document façade systems and structural systems through drawings and parametric modeling to inform a design system, that will be driven by performance, material properties and aesthetic qualities. The analyzed system is translated into a parametric model and explored through varying design parameters. Each student is expected to develop a geometric system that has its own logic for construction, materiality and assembly.