Course Number: ARCH 6502 MS (CRN 28954)
Course Title: Design Scripting
Instructor: Matthew Swarts matthew.swarts@coa.gatech.edu
Credit Value: 3 credit hours
Course times: Tuesdays 6:05pm-8:55pm
Location: Architecture West 358
Website: http://www.designscripting.gatech.edu/spring2017

Catalogue Description:
Learning the concepts and application of scripting languages in architecture and form generation.

Objectives:
The computer has become a manifest tool for nearly all phases of the design process. "But lo! [We] have become the tools of [our] tools." – Walden (1854). To overcome our tools, we must re-learn how to create them for ourselves. The purpose of this course is provide an introduction to computational methods of representing and evaluating spatial configurations, perceptions, and experiences through the use of computer scripting languages.

The primary languages for this course will be Python, Javascript, and Embedded C. The basic syntax and structure will be covered in the class as needed. This course presumes no prior knowledge in computer science; however students are expected to practice outside of class. We will make use of Grasshopper, the graphical scripting plugin to Rhino. We will use the Brackets to program in Javascript for HTML5 in any web browser. We will use Arduino for embedded programming. We will explore a few add-ons, but will primarily be creating our own custom scripts and programs. This course is supplementary to Parametric Modeling, Design Space Construction, Design Space Exploration, Geometric Constructs, and Media and Modeling.

Learning Outcomes:
Upon completion of the course, students are expected to:
- Create and execute a script in an Integrated Development Environment
- Create and iterate through multi-dimensional lists
- Read, write, and parse image, text, and other media types
- Import external libraries and integrate them into a script or program
- Express a design problem through a computational model

Course Format:
The class will meet once a week for lectures, activities, tutorials, and in-class assignments. Short video based lectures, script assignments, and basic web-based script learning assignments will be required before each class. A log of weekly assignment outputs will be posted to a class website. A midterm exam will be used to assess basic scripting skills. A final project and presentation on a spatial design challenge will evaluate working knowledge of the techniques taught in the course.

Topics:
Tiling, Fractals, Shape Grammars, L-Systems, Particle Systems, Agent-Based Models, Collision Detection, Diffusion Limited Aggregation, Circle Packing, Cellular Automata, Reaction Diffusion, Graph Theory, Shortest Path, Physical Simulation, Triangulated Meshes, Lagrangian Relaxation, Occlusion, Enclosure, Isovists, Sockets, Tangible and Embodied Interaction.