

# Computing Drawing: Inhabiting Surface **Syllabus**

This studio explores computer programming as a design medium. How programming can and should be used to conceive of architecture is an open question—a question that “off the shelf” modeling and drafting software unfortunately circumvents. Rather than immediately computing architecture, this studio begins by computing drawing, which, by definition, allows the human eye and mind to play a prominent role in design. Conceptions of authorship, ambiguity, and representation remain the focus of attention and criticism as the course moves from drawing to building.

The studio is organized into three overlapping phases. The first is a kind of calisthenics and begins by coding in the Python programming language to control a machine (pen plotter, laser cutter or other) that affects sheet material. Drawing at this stage is a prime territory for learning the language of computing because its reduced dimensions make mathematics and logics simpler than working in three dimensional space.

The second phase involves drawing in space, or computing three dimensionally without fixed scale or material. Surface is paradoxically thickened. As is the case in the first phase, the products here straddle the line between work of art and work of architecture. Because Python has recently been adopted as a scripting language in Rhinoceros and other software, we are able to tap into those geometric libraries as needed and eventually extend our algorithms into the third dimension and/or build out the thickness that we read in the drawing surface into a digital and physical construct. In this phase, non-uniform rational basis spline (NURBS) surfaces are of particular opportunity because of their inherently two-dimensional operational structure in three-dimensional space. Constructs evolve based on prompts laden with enigmatic and seemingly contradictory requirements rooted in inherently architectural problems and conditions: the corner, edge, solid and void.

The third phase sees the introduction of site and program at a political border in the landscape, which is intersected by human transportation infrastructure. Computing in the realm of drawing remains a generative force in this phase. The act of representing influences details, material, structure, and assembly.

## **Pedagogy and Expectations**

As an advanced studio, this course aims to convolve a research agenda with an educational agenda. Students are asked to confront and produce (and combine) questions, techniques, methods, and products that are new to them and new to the discipline. Process and product will be subject to rigorous critique. This studio will rely on and leverage the foundational education—students will continually be asked to operate at their “highest level of craft and intellectual acuity to date”—while simultaneously inviting the questioning of individual as well as collective conventions and defaults.

This studio will include technical instruction and an inquiry into the “topic” of computation, but technique will be presented concurrently with concept. As has been the case throughout the foundational core of this curriculum, thinking and making will be seen as indistinguishable.

## **Support**

The RISD Code Studio ([codestudio.risd.edu](http://codestudio.risd.edu)) is a community resource that may be of valuable to students in this course outside of class. The Code Studio offers tutoring sessions to RISD students. The Code Studio also offers a cross-disciplinary intellectual community with events and publications, both of which are optional avenues to enrich students' experience in this course. The Code Studio also operates a Google group, which we will use a help/discussion forum for outside of class discussion.

## **Grading and Evaluation**

Process and product will both be evaluated together. Iteration and other strategies for asserting methodological rigor will be essential for student success. Students will be evaluated for their participation (through their work and their verbal engagement) in every studio session. Students are expected to respond to prompts provided in each assignment brief as well as those offered through in class discussion and critique. RISD defines final letter grades as follows: A Excellence; B Above Average; C Average (successfully fulfilled all course requirements); D Below Average (course requirements minimally met); F Failing Grade (course requirements not met)

## **Attendance**

This is a fast paced studio with little opportunity for redundancy. Absences, excused or otherwise, will set a student back and will be difficult to make up.

## **Tentative Schedule**

Phase 1: Algorithmic Drawing with the Problem of Foreign Input: Review 3.10

Phase 2: Thick Surface Construct with Architectural Problems: Review 4.17

Phase 3: Border Station in the Landscape: Final review week of 5.19

## **NAAB**

This course satisfies the following conditions for accreditation by the National Architectural Accrediting Board, Inc: Design Thinking, Applied Research

## **Department/University Academic Policy**

Please refer to the following documents for information regarding academic values, policy and procedures

Department of Architecture,  
Studio Culture Policy <https://sites.google.com/a/risd.edu/beb-office/home/policies-procedures/studio-culture>

BEB Rules and Regulations <https://sites.google.com/a/risd.edu/arch-student/home/rules-regulations>

RISD Student Code of Conduct <http://www.risd.edu/Students/Policies/>