

ARC 640: COMPUTER APPLICATIONS- RELATIONAL GEOMETRIES

SPRING 2009 TUES, THURS 8:30-9:50

HAYES 108, 132, 239

Instructors: OMAR KHAN and NICHOLAS BRUSCIA

Eligibility: Graduate Students that have passed ARC 611 or equivalent, Shop Training



Nick Bruscia, Allotropic Systems

Course Description:

This techniques seminar introduces students to the next generation of computer aided design tools that facilitate movement between digital modeling and material prototyping. Working from the idea of parametric design, the seminar methodically moves through a project exploring NURBS modeling, parametric modeling, rapid prototyping, mold making and material prototyping. The software environments that the seminar will introduce are Rhinoceros 4.0 and Grasshopper 0.5, while the rapid prototyping tools include the Universal Laser Cutter and the Dimension 3d Printer. We will begin by exploring the possibilities offered by NURBS modeling through Rhinoceros 4.0. Within this environment we will look at designing surface models whose geometry is derived from natural artifacts. These will be further studied through parametric variation in Grasshopper, which will become the basis for material explorations through the laser cutter, 3D printer and material casts. The seminar's investigations are developed around the theme of *response*. We will explore *responsiveness* in two ways- how architecture can change its organization relative to a phenomenon and/or how a phenomenon can be transformed through the architecture. In both cases response is understood as a morphological change- in the architecture, the phenomenon or both. Each student will create responsive architectures for one of the following natural contexts: **earth, water, light, or wind**. Our approach will be to derive geometric relations from natural artifacts, study their performative behavior, and construct prototypes of materially responsive systems.

Course Objectives and Outcomes:

The course's objective is to use the next generation of digital design tools to develop productive techniques for architectural design. Students will become proficient in the use of these tools as well as cognizant of their potential affordances for design.

Course Schedule: *

01.13/01.15	ARTIFACTS- Introduction to NURBS modeling [Rhinoceros 4.0]	
01.20/01/22	ARTIFACTS I- Study of natural geometries [Raster, Vector inputs]	LOG 1
01.27/01.29	ARTIFACTS II- Initial design of geometry [Rhinoceros 4.0]	
02.03/02.05	ARTIFACTS III- Development of responsive geometries [Rhinoceros 4.0]	
02.10/02.12	ARTIFACTS IV- Initial fabrication of design [Dimension 3D Printer]	LOG 2
02.17/02.19	PATTERNS & TILES I- Derivation of performative patterns [Grasshopper]	
02.24/02.26	PATTERNS & TILES II- Initial Fabrication of design [Universal laser Cutter]	
03.03/03.05	PATTERNS & TILES III- Development of design	LOG 3
03.10/03.12	SPRING RECESS	
03.17/03.19	PERFORMATIVES I- Molds [3D Studio MAX]	
03.24/03.26	PERFORMATIVES II- Materials workshop [Foundry]	LOG 4
03.31/04.02	PERFORMATIVES III- Materials Intelligence	
04.07/04.09	Design Development	LOG 5
04.13/04.16	Design Development	
04.21/04.23	Final presentation	LOG 6

* This schedule is subject to change