CIEE in Barcelona, Spain

Course name:	Science, Engineering and Technology Workshop
Course number:	ARCH 3004 BASP
Programs offering course:	Barcelona Global Architecture and Design
Language of instruction:	English
U.S. Semester Credits:	3
Contact Hours:	45
Term:	Spring 2019

Course Description

The workshop module seeks to address several objectives in parallel:

1. To give a perspective and spark discussions on the designer's roles in the current age of digital tools;
2. To transmit strategies for appropriate procedural modeling and parameter associativity;
3. To introduce evolutionary computation driven by contextual analysis.

Learning Objectives

The first objective is simple and seeks to introduce the course participants to the digital object they will be (and have been) interacting with for the remainder of the course, and if they choose, for the remainder of their career. While this might sound obvious, often a designer does not recognize the role of the digital computer in creative processes. Has architecture and urbanism been affected by the adoption of computational processes? How can designers conceive of iterative processes to be carried out by their digital instruments?

After acquainting ourselves with the tools at our disposal, we will work with Rhinoceros 3d to learn about procedural modeling and the different nurbs and mesh topologies. How do we decide which topology to choose? Throughout this, we will introduce parametric modeling with Grasshopper 3d to further inform the modeling processes.

In order to build upon the first two sections of the course, we will add further information to our models through a series of analytic strategies that will derive parameters from contextual environmental information. This environmental information will feed a computational model which we will set up to effectively evolve designs to reach certain optimum levels given the designer's objective.

Course Prerequisites

Basic 2D Drafting and 3D modeling knowledge.

Methods of Instruction

In-class digital tools tutorials, Brief thematic lectures as an overview and extension of any important topic, hands-on fabrication tutorials, project reviews.

Assessment and Final Grade

1. Participation in Class: 30%
2. Project (Design Studio project modeling, analysis and simulation): 70%

Course Requirements

Attendance Policy

Students are expected to attend all scheduled class sessions on time and prepared for the day's class activities. CIEE does not distinguish between justified or unjustified absences, whether due to sickness, personal emergency, inevitable transport delay and/or other impediments. You are considered responsible of managing your own absences. Please keep in mind that exams, paper submission dates, presentations and any other course work deadlines cannot be changed.

No academic penalty will be applied if students miss up to 2 class sessions. If students miss up to 3 class sessions, students' final course grade will drop 5 points out of 100 on the CIEE grade scale. **Students will automatically fail the course if they miss more than 20% of total class hours (i.e. if they exceed 3 absences).**

For students who miss up to 20% of the total course hours due to extenuating circumstances, the Academic Director may allow for exceptions to the local attendance policy based on documentation such as proof of bereavement, religious observances, hospitalization etc.

Students arriving more than 10 minutes late to the class will be considered absent for a day.

Weekly Schedule

Session 1

Workshop introduction, Installation Check, Discussion on workshop topics, Modeling tutorials, Introduction to fabrication

Session 2

Parametric modeling

Session 3

Parametric modeling and Mapping

Session 4
Parametric modeling and Mapping

Session 5
Analysis and simulation strategies

Session 6
Analysis and simulation strategies

Session 7
Data driven models

Session 8
Data driven models

Session 9
Berlin Summit

Session 10
Fabrication focus

Session 11
Fabrication Focus

Session 12
Fabrication Focus

Session 13
Studio Support and Synthesis

Session 14
Studio Support and Synthesis

Session 15
Studio Support and Synthesis

Readings

Davis, Daniel. Patrik Schumacher - Parametrisicm. http://www.danieldavis.com/patrik-schumacher-parametricism/

Trummer, Peter. "Engineering Ecologies." Versatility and Vicissitude: Performance in Morpho-ecological Design Ed. Michael Hensel and Achim Menges. London: Wiley, 2008. 96-101. Print.

Silver, Mike, ed. Programming Cultures: Art and Architecture in the Age of Software. London: Wiley-Academy, 2006. Print.

Schumacher, Patrik. Parametricism as a Style.
http://www.patrikschumacher.com/Texts/Parametricism%20as%20Style.htm