Spring 2015: University of Southern California, School of Architecture
Justin Brechtel

Architecture 207: Computer Applications in Architecture

Section 11233
10:00-11:50am Mondays
Room: WPH B36

Contact: Please email or call Justin Brechtel if you have questions - **brechtel@usc.edu** or 213-740-2723.

Office Hours: Monday 12:30-1:30pm by appointment

General Description

Our material world is primarily produced by a method in which design, analysis, representation, fabrication and assembly is a seamless process - with the glaring exception of the building industry. Until recently, the building industry has rejected this methodology and instead relied upon a traditional project delivery method- a method that has increasingly separated the architect from the building process. This separation thus necessitated the production of two-dimensional representations by the architect in order to communicate the design intent to a third party builder. Whether by tradition or necessity, the notational limitations of the plan/section/elevation representation has remained the primary method by which the architect communicates design. But as architects are increasingly exploring more complex forms, it has become crucial to find design and production methodologies to realize these projects in the built environment without incurring the information loss inherent in traditional design representations. Essential to this course is an understanding of how increasing efficiency of software and emerging fabrication techniques are changing the way built projects can potentially be realized. This is a fundamental shift away from utilizing the computer as a visualization/documenting tool, and moving toward recognizing the computer as a generative tool.

This course will leverage software and fabrication technologies through the modeling, visualization, and production of phases of the design process. Our work this semester is roughly structured around these phases as we focus exercises around each tool.

As a point of reference, we will explore three-dimensional tile sculptures by artists Edwin Hauer and Norman Carlberg as source material and inspiration for our work this semester. We will be analyzing and rebuilding a selection of their work in a series of exercises dedicated to mastering three-dimensional modeling techniques within Rhinoceros 3d. We will then use that work as inspiration to design your own “sculptures”. These re-

imagined sculptures will be the basis for our exploration of the potentials for rapid-prototyping utilizing 3d printing technologies available at the school. Lectures on these topics are accompanied by software and machine demonstrations, in-class exercises and assignments to familiarize students to both the digital as well as the fabrication environments.

Lastly, quality and clarity of presentation will be emphasized in each assignment. All work undertaken in this course should be treated as a design exercise. Students are encouraged to explore design communication techniques as a basis for developing an individual rendering and presentation style.

Assignments

Exercises throughout the semester will introduce a variety of techniques and tools currently utilized by architects in design offices. These assignments will be a combination of in-class and on-line tutorials, supplemented by readings appropriate to the topics covered. All exercises and tutorials are expected to be completed using Rhinoceros 3d v5 (latest service release). Where required for specific assignments, proprietary software will be introduced. Rendering and presentation techniques will be emphasized throughout the semester and will make up a portion of the grading requirements for most assignments. Rendering assignments will utilize the VRay plug-in for Rhinoceros 3d v5. We will also be using the Adobe Creative Suite for presentation materials and animations. Most of the final grade for the course will be based on the eight main assignments which are typically two to three weeks in duration. Assignments are spaced to allow students to bring progress to class for suggestions before the assignment is due.

Grades are based on the level of completion; craftsmanship of both the digital and physical models, and participation as gauged by the in-class exercises and quizzes. In addition to turning in the final product of each assignment, you will be expected to also turn in your progress. Assignments turned in without adequate proof of process will be deemed incomplete.

LATE ASSIGNMENTS WILL NOT BE ACCEPTED; TURN IN WHAT YOU HAVE ON THE DUE DATE. There are no “make-up” assignments. Assignments will be submitted using Blackboard. All digital files submitted for grading shall confirm to the following file naming convention:

"01-*LastNameFirstName-description.fileextention"*
"02-*LastNameFirstName-description.fileextention"*

Points will be deducted from assignments not conforming to the naming convention.

Grades, homework assignments and tutorials will be posted on Blackboard at blackboard.usc.edu. If you are registered for the course, and can not access this class on Blackboard, contact your academic adviser, as soon as possible.

PLEASE NOTE THAT YOU ARE EXPECTED TO COMPLETE ALL HOMEWORK ASSIGNMENTS BY YOURSELF USING THE SOFTWARE THAT HAS BEEN ASSIGNED. COPYING OTHER PEOPLE'S FILES OR TURNING IN WORK THAT YOU DID NOT COMPLETE YOURSELF WILL RESULT IN A FAILING GRADE.

Grading Breakdown:

Assignments: 50-100pts, 750pts total
Final Exam: 200pts
In-Class Exercises: 50pts total
Total: 1000pts

Other Important Items

Backup, **Backup**, and **Backup** again.

This cannot be stressed more. Assignments in this class rely on work you have completed on previous assignments. You are responsible to bring all your work to class each day. In addition, you will need methods for backing up your assignments. I recommend a minimum of (2) flash drives and a cloud-based storage account (google drive, dropbox, copy, etc.). Do not just have one copy of your assignment! Keep multiple backups and old versions to show your process, where appropriate. Label all media with your name and e-mail address. The computer ate my homework is not a valid reason for missing a deadline.

A USC e-mail account is required for this course. Go on-line and verify that your USC account is working. Call 0-5555 if you have problems accessing your account. You will need to use your USC account for posting assignments to blackboard and for reading your email.

Purchase

Students will be expected to purchase digital storage media and output materials (color plots, laser cutting, and 3d printing materials). If you have your own computer, I recommend purchasing a copy of Rhino 3D v5, Vray Render Plug-in and Adobe Suite for use outside of class. Demo versions are available for immediate download that will allow you to use the software for a limited amount of time.

Additional Resources

Refer to Blackboard for current links to online resources and software reference documents.

Required Reading

The following books on reserve in the Architecture and Fine Arts (AFA) Library. Please note that these books are reserved for multiple classes, not just this class. Additional readings will be assigned during the semester. The reading will be assigned each week through Blackboard and are intended to supplement the content covered in class.

Hauer, Erwin; Continua, Architectural Screens and Walls, 2004

Kolarevic, Branko and Klinger, Kevin (editors); Manufacturing Material Effects: Rethinking design and making in architecture, 2008

Reeser, Amanda and Schafer, Ashley (editors); New Technologies://New Architectures, Praxis Journal of Writing + Building, Issue 6, 2004

Hauschild, Moritz and Karzel, Rudiger (editors); Digital Processes, Planning Design Production, Detail Practice, 2011

Religious Holidays

The University of Southern California recognizes the diversity of our community and the potential for conflicts involving academic activities and personal religious observation. The University provides a guide to such observances for reference and suggests that any concerns about lack of attendance or inability to participate fully in the course activity be fully aired at the start of the term. As a general principle students should be excused from class for these events if properly documented and if provisions can be made to accommodate the absence and make up the lost work. Constraints on participation that conflict with adequate participation in the course and cannot be resolved to the satisfaction of the faculty and the student need to be identified prior to the drop/add date for registration. After the drop/add date the University and the School of Architecture shall be the sole arbiter of what constitutes appropriate attendance and participation in a given course.
Please contact Justin Brechtel at brechtel@usc.edu by the end of the second week of class if you anticipate conflicts with religious holidays including missing lectures, inability to finish homework assignments on-time, or other items that may hinder your work in this class.

Rehabilitation Act (LAB 504) and The Americans with Disabilities Act (ADA)

The University of Southern California is committed to full compliance with the Rehabilitation Act (Lab 504) and the Americans with Disabilities Act (ADA). As part of the implementation of this law, the University will continue to provide reasonable accommodation of academically qualified students with disabilities so those students can participate fully in the University's educational programs and activities. Although USC is not required by law to change the "fundamental nature of essential curricular components of its programs in order to accommodate the needs of disabled students," the University will provide reasonable academic accommodations. The specific responsibility of the University administration and all faculty serving in a teaching capacity is to ensure the University's compliance with this policy. The general definition of a student with a disability is any person who has "a physical or mental impairment which substantially limits one or more of such person's major life activities," and any person who has "a history of, or is regarded as having, such an impairment." Reasonable academic and physical accommodations include but are not limited to: extended time on examinations; substitution of similar or related work for a non-fundamental program requirement; time extensions on papers and projects; special testing procedures; advance notice regarding book list for visually impaired and some learning disabled students; use of academic aides in the classroom such as note takers and sign language interpreters; early advisement and assistance with registration; accessibility for students who use wheelchairs and those with mobility impairments; and need for special classroom furniture or special equipment in the classroom.

Physical Accommodations

Students with physical disabilities should contact Disability Services and Programs (DSP) prior to or during the first week of class attendance or as early in the semester as possible. The office will work with classroom scheduling, the course instructors and their departments, and the students to arrange for reasonable accommodations. Disability Services & Programs: (213) 740-0776

Academic Accommodations

Students seeking academic accommodations due to a physical or learning disability should make the request to the course instructor prior to or during the first week of class attendance, as well as registering with DSP as early in the semester as possible. Course instructors should require that a student present verification of documentation when academic accommodations are being requested. For assistance in how to provide reasonable accommodations for a particular disability, course instructors are encouraged to consult with Disability Services and Programs (DSP). Students requesting academic accommodations who do not have DSP documentation should be referred to that office.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted

unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

http://www.usc.edu/dept/publications/SCAMPUS/gov/

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at:

http://www.usc.edu/student-affairs/SJACS/

Here is a website link for assistance in avoiding plagiarism:

http://www.usc.edu/student-affairs/student-conduct/ug_plag.htm

Specifically for graduate students, but also useful for undergraduate students:

http://www.usc.edu/student-affairs/student-conduct/grad_ai.htm

Accreditation Statement

"The USC School of Architecture's five year BARCH degree and the two year M.ARCH degree are accredited professional architectural degree programs. All students can access and review the NAAB Conditions of Accreditation (including the Student Performance Criteria) on the NAAB Website, http://www.naab.org/accreditation/2009_Conditions