

ARCH-615

Title: Advanced Topics in Environmental Controls – Building Energy Performance Simulation

Units: 4

Semester: Spring 2014

Grading Type: Letter-Graded

Course Type: Regular class

Location: Harris Hall #102

Day and Time: Thursday 1:00 PM – 4:50 PM

Instructor	Murray Milne	Joon-Ho Choi
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Phone	310-454-7328	213-740-4576

Professor Milne is available by phone between 10 am and 10 pm at 310-454-7328, 7 days per week, and by email at about 9:00 am and 6:00 pm at mmilne@usc.edu and on Thursdays by appointment. Professor Joon-Ho Choi is available by email and in his office at the times posted on Blackboard or by appointment.

Teaching Assistant: Maria Spastri

Office Location: MBS Studio, 3rd floor, Watt Hall

Office Hours: By Appointment

Email: spastri@usc.edu

IT Help: Enrique Barajas

Contact Info: ebarajas@usc.edu

Contact Hours: TBD.

Course Description

Students studying in the field of architecture, environmental design, and building science should have an analytical skill for quantitative investigation and design decision process for a high-performance building. This course is aimed at giving senior or graduate students an exposure to a systematic evaluation process for building performance. This course introduces the concept of total building energy performance, delineating the full range of performance mandates required for today’s architecture, including building integrity. The course will explore the relationship, opportunities, and conflicts of the performance mandates, and the integration of building systems necessary to achieve total building energy performance. Through lectures and seminar instructions, student should be able to develop a basis for environmental design performance and system design skills, towards creating high-performance buildings.

Course Organization: In the first half of each class student will present the prior week's project, and then in the second half of the class, there will be a lecture to introduce the next week's project.

Time Commitment: This class has four contact hours, and the University expects students to invest two hours of preparation for each contact hour, so this course requires about 12 hours per week. A full graduate load is three courses of this type, or 36 hours per week minimum. If you do not believe you can complete the project preparation within the 8 hours allotted, let the instructor know.

Grades: This of this class as a USC team. Everyone must participate for this class to be a success. Some of you will have more prior experience than others in some areas. I believe students learn more from each other than from the faculty, so please help each other out, and you must participate in class discussion. This is why your class presentation of your work is so important and is considered as part of your grade. However, every student must submit only his/her own work. Grades are based on effort and participation and progress over the course during the semester, so if each of you completes all the assignments, on time, and contributes to class discussions, each of you should earn an A.

Grading Breakdown

	Points	% of Grade
Mid-term project	300	30%
Final project	400	40%
Assignments	200	20%
Class participations	100	10%
TOTAL	1000	100%

Supplementary Materials and Resources

- Mechanical and Electrical Equipment for Buildings (Grondzik et al., 11th edition, Wiley)
- California Energy Commission -Building Energy Efficiency Standard TITLE 24 (2013)
- ASHRAE 90.1 - 2013
- ASHRAE 55 Standards: Thermal Comfort - 2013
- ASHRAE 62.1 Standards: Ventilation for Acceptable Indoor Air Quality - 2013
- ASHRAE High Performance Building Handbook
- Indoor Environmental Quality (Thad Godish, CRC Press, 2000)
- Useful discussion group:
 - o Society of Building Science Educators
 - <http://www.sbse.org>
 - sbse@uidaho.edu
 - o EnergyPlus Support group
 - http://groups.yahoo.com/neo/groups/EnergyPlus_Support/info
 - EnergyPlus_Support@yahoogroups.com
 - o Building energy simulation user group
 - <http://lists.onebuilding.org/listinfo.cgi/bldg-sim-onebuilding.org>
 - bldg-sim-request@lists.onebuilding.org
 - o California Energy Commission Hotline: 800-772-3300

Course Notes

Lecture notes, syllabus, handouts, reading assignments, and any other course materials will be posted on Blackboard. Practice with building simulation tools for homework or assignments will be incorporated with the course.

Attendance: We expect everyone to have their work pinned up or their Power Points loaded on the class computer within the first 10 minutes after the hour, so please come early.

Bottom Line: The most important issue is that you are responsible for your own personal learning. You need to help us help you. If you find yourself falling behind you must let us know. We will try to give you feedback if we think you are getting off track.

Assignment Submission Policy

Deliverables are defined as any work required from the student that was assigned for acquisition or preparation outside of the regular classroom, e.g. web-based reference documents, homework, take-home quizzes, and projects. All deliverables are mandatory and due at the beginning of class on the required due date. Failure to submit a deliverable on-time and reasonably well attempted shall result in a deduction of 50% of the assigned point value, with an additional 10% deducted for each full-day late until such work is delivered into the instructor's possession, properly completed. Any deliverable not properly submitted within one calendar week of a required due date may result in a failing grade to the student in this course. Any student who may be absent from class on the due date may submit their work beforehand directly to the instructor, or, on the due date via another student. Exceptions to this policy shall be considered with adequate justification.

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website and contact information for DSP:
http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html, (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu.

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, (www.usc.edu/scampus or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

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/>. Information on intellectual property at USC is available at: <http://usc.edu/academe/acsen/issues/ipr/index.html>.

Emergency Preparedness/Course Continuity in a Crisis

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

ARCH 615 SCHEDULE OF CLASSES

Date	Week	Present Project Due	Lecture Topic
Jan. 16	1		Climate Consultant, Thermal Comfort, Guidelines
Jan. 23	2	Climate Analysis: Hometown	HEED (Home Energy Efficient Design)
Jan. 30	3	Analyzing your own home	HEED (choose a home to use for the next 8 weeks)
Feb. 6	4	Energy Performance in HEED	EnergyPro (same residential building)
Feb. 13	5	Energy Performance in EnergyPro	BEopt + EnergyPlus (same residential building)
Feb. 20	6	Energy Performance in BEopt	SketchUp + Green Building Studio (DOE2) (same residential building)
Feb. 27	7	Energy Performance in Green Building Studio	DesignBuilder + EnergyPlus (same residential building)
Mar. 6	8	Energy Performance in EPlus	Revit and IES VE-Ware +Apache (same residential building)
Mar. 13	9	Revit and IES VE-Ware	Revit and IES VE-Pro + Apache (same residential building)
Mar. 20	10	Spring break	
Mar. 27	11	Revit and IES VE-Pro	Discuss Individual Final Project ideas
Apr. 3	12	MID-SEMESTER PROJECT	(Submit your Mid-Semester Project Notebook) We want to meet with each of you during this week to discuss your Final Project, by appointment, but first email us your tentative final Project idea.
Apr. 10	13	Lecture: Calibration process (Choi)	Present Final Project Abstract to class. We want to meet with each of you at least once more re your Final Project
Apr. 17	14	Guest Lecture: TBA (Kohut)	Discuss half-way point problems of final projects
Apr. 24	15	Guest Lecture: TBA (Pablo)	Discuss final presentation completion
May 1	16	Guest Lecture: TBA (KAL)	Course Wrap-up + Final Jury Organization
TBA			Final week: Tentative; 1 to 5 PM