

Faculty:

Lauren Dandridge Gaines

Elizabeth Valmont

Tony Cocea

Architects deal with a broad spectrum of constraints and opportunities when designing or thinking about design. Much of the way that a building is experienced relates to the Environment created by the building, both within and without. This is especially true in terms of light and sound. The interaction between occupant and building is almost entirely filtered through those two-sensory media. This course deals with those channels, their perception, their effect, and how the designer controls or manipulates those experiences. It is necessary to understand the processes, the perceptions, and the materials and tools with which we work.

Certain similarities exist in the behavior of these systems and the behavior of thermal systems which we discussed last semester, simply because they are natural physical functions.

Near the end of the semester, we will also cover topics such as mechanical, electrical and plumbing systems, designing for fire safety, and building accessibility. These systems are also critical performance issues for the building. They can be less form determinate and normally set limits, they are still critical in the performance of each building, both for life safety reasons and as a necessary part of our professional responsibilities to the building users.

**NAAB Student Performance Criteria Covered in this Course:**

**A.11 Applied Research**

**B.2 Accessibility**

**B.3 Sustainability**

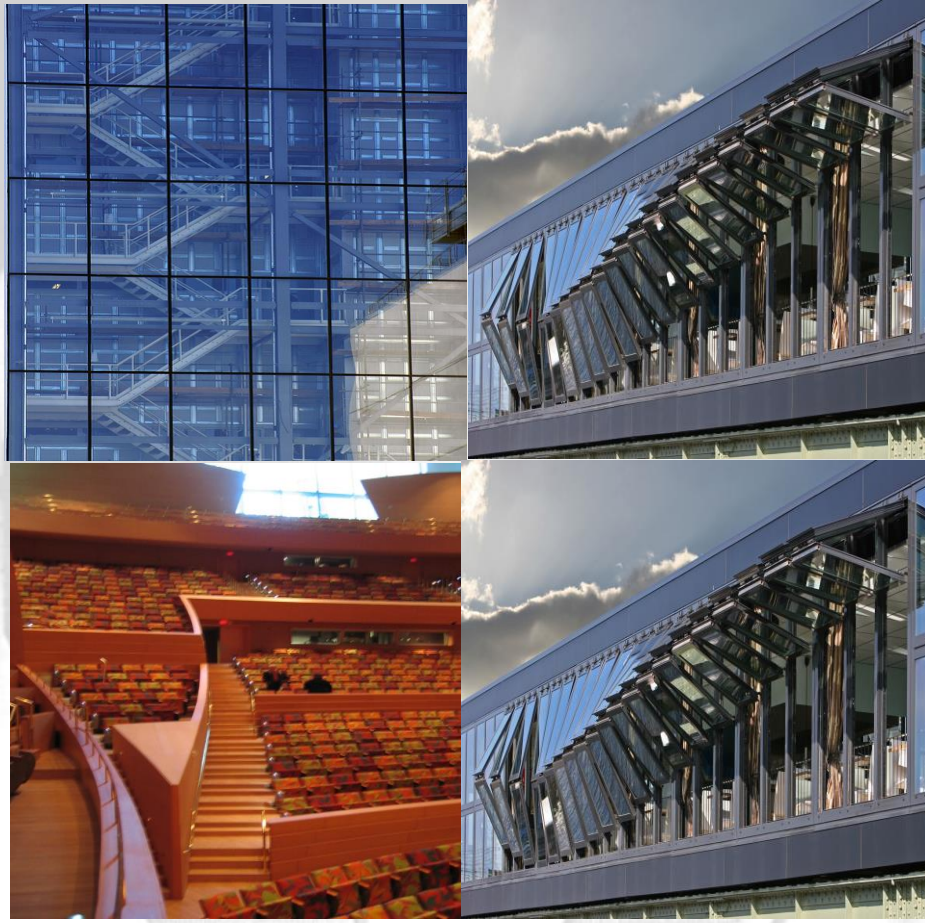
**B.5 Life Safety**

**B.6 Environmental Systems**

**B.9 Building Service Systems**

**B.10 Building Envelope Systems**

**C.2 Human Behavior**



The material will be divided into three basic segments:

- I. Lighting
- II. Acoustics
- III. Building Engineering Systems

The class will be primarily a series of lectures, demonstrations, assignments and quizzes or tests to determine what is being comprehended and what needs more work.

The homework assignments are graded. It is beneficial to have done the homework because the quizzes and prelims will be similar in content. Remember, doing and understanding the material will be much more beneficial than just having copied it into your notes.

Copies of the syllabus, homework, and other announcements may be found on the class blackboard website. We hope to be able to maintain this address throughout the semester.

There will be a quiz during the lighting and the building system segments, the dates are listed in the syllabus. There will be a preliminary examination at the end of the lighting and the acoustics segments. The dates are listed in the syllabus. It is your responsibility to attend each class and to know what those dates are. There will be a comprehensive final at the end of the semester. All of the tests (quizzes, preliminary exams, final exam) will be "open book." This means that books and notes may be brought into



the exam, but ***copies of previous exams or quizzes are not allowed, nor are printouts of the web pages.*** You may bring a homework which you have done, but not an answer sheet from the web. Too many students have counted on these in the past, instead of doing the homework, and the result has been a *drop* in the average grades! Your exam may be disqualified.

The grading will be based on the following percentages:

Attendance		5% subtotal
Homework		5% subtotal
Quizzes (2)	10% each	20% subtotal
Prelim (2)	20% each	40% subtotal
Final	30% each	30% subtotal

There are recommended texts, and one required handout. The handout will be made available in class; the texts should be available at the bookstore. Please keep an active notebook with all of the materials handed out, and all homework. Again, tests will be open book and open notes, and you should have that material available. Keep it when you go on to practice architecture. It is not our intention to have you memorize things which you will then forget, but rather to understand information and concepts which you can access at a future date.

If you are interested in material which you do not find on the course outline, please let us know, and we will attempt to include it.

### **Recommended Texts**

*Mechanical and Electrical Equipment in Buildings*; by Stein, Reynolds. Kwok, Grondzik- this is the same text as for ARCH 215.

*Simplified Design of Building Lighting*; by Marc Schiler - for advanced interest, also used in ARCH 515.

*Architectural Acoustics*; by M. David Egan - for advanced interest, not required.

### **NAAB Conditions for Accreditation**

The USC School of Architecture's five year BARCH degree and the two year MARCH 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/2004\\_Conditions.aspx](http://www.naab.org/accreditation/2004_Conditions.aspx).

### **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 my GRS students) as early in the semester as possible. DSP is located in STU 301 and is open 8:30AM-5PM, Monday through Friday. The phone number for DSP is (213) 740-0776

## **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/>

## **Disruptive Behavior**

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

## **Critical Dates and Religious Observances**

The university 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.

## **School of Architecture Policy on Attendance**

Attending classes is a basic responsibility of every USC student who is enrolled in courses at the School of Architecture. Regular and punctual class attendance is considered an essential part of satisfying the NAAB accreditation requirements therefore attendance will be taken at every class session. A student may miss up to two class sessions without directly affecting their grade and ability to complete the course if they provide an excused absence for any confirmed personal illness/family emergency/religious observance. For each absence over that allowed number, the student's letter grade is in danger of being lowered up to one full letter grade. Any student not in class within the first 10 minutes is considered tardy, and any student absent for more than 1/3 of the class time can be considered fully absent. If arriving late, a student must be respectful of a class in session and do everything possible to minimize the disruption caused by a late

arrival. It is always the student's responsibility to seek means to make up work missed due to absences. ***Being absent on the day of a quiz or exam results in a 0 for that quiz or exam.***

### **2010 Imperative Statement:**

The Architecture Faculty have voted to accept the 2010 Imperative-- to improvement of ecological literacy among the students and faculty and to achieve a carbon-neutral design school campus by 2010. To that end, this class will address issues of carbon neutrality and *supports* the following goal for all designs produced in the USC School of Architecture:

"The design should engage the environment in a way that dramatically reduces or eliminates the need for fossil fuel."

This does not mean that no other issues are to be addressed. Precisely to the contrary, all design issues are fair game, but in the background, all will be considered within the generalized goal of reducing or eliminating the need for fossil fuel.

### **Instructor Contact Information**

Lauren Dandridge Gaines, [ldandrid@usc.edu](mailto:ldandrid@usc.edu)

Elizabeth Valmont, [evalmont@usc.edu](mailto:evalmont@usc.edu)

Tony Cocea, [cocea@usc.edu](mailto:cocea@usc.edu)



## COURSE SCHEDULE

**ARCH 315**

**Section 11286D**  
**Tues,Thurs 2:00PM-3:20PM**

**HAR 101**

### **Design for the Luminous and Sonic Environment**

Ideas, problems and computations related to the design of buildings in response to the luminous and the sonic Environment and other building engineering systems.

#### **Text : Mechanical and Electrical Equipment**

Eleventh Edition

by Grondzik, Kwok, Stein and Reynolds

#### **Recommended Text: Architectural Acoustics**

by M. David Egan

### **Section 1: Lauren Dandridge Gaines**

<b>1</b>	<b>Lighting Fundamentals and Basic Perception</b> <b>January 8, 2019</b>	<b>Tuesday</b>
	Lecture	Introduction
	Recommended Reading	Chapter 11.15-11.29
	Homework Due Today	None
<b>2</b>	<b>Physics of Light and Color</b> <b>January 10, 2019</b>	<b>Thursday</b>
	Lecture	Physics of Light and Color
	Recommended Reading	Chapter 11.34-11.39
	Homework	Homework #1
<b>3.</b>	<b>Lighting Sources</b> <b>January 15, 2019</b>	<b>Tuesday</b>
	Lecture	Lamps and Artificial Light Sources
	Recommended Reading	Chapter 12
	Homework	Homework #2
<b>4</b>	<b>Designing with Artificial Light, Equipment, Point Grid</b>	

	<b>January 17, 2019</b>	<b>Thursday</b>
	Lecture	Artificial Light and Equipment
	Recommended Reading	Chapter 15.1-15.12 and 16.1-16.30
	Homework	Homework #3
5	<b>Calculating Light-Lumen Method/ Applications January 22, 2019</b>	<b>Tuesday</b>
	Lecture	Lighting Calculations
	Recommended Reading	Chapter 15.18-15.32
	Homework	Homework #4
6	<b>Quiz #1 January 24, 2019</b>	<b>Thursday</b>
	Lecture	None
	Recommended Reading	TBD
	Homework	None
7	<b>Basic Electricity and Dimming January 29, 2019</b>	<b>Tuesday</b>
	Lecture	Electricity and Dimming
	Recommended Reading	TBD
	Homework	None
8	<b>Designing with Daylight January 31, 2019</b>	<b>Thursday</b>
	Lecture	Designing with Daylight
	Recommended Reading	Chapter 14
	Homework	Homework #5
9	<b>Lighting Applications February 5, 2019</b>	<b>Tuesday</b>
	Lecture	Guest Lecture
	Recommended Reading	TBD
	Homework	Prepare for prelim exam
10	<b>Preliminary Exam #1</b>	

**February 7, 2019**

Lecture

Recommended Reading

Homework

**Thursday**

None

Section 1 Recap

None

**Section 2: Acoustics** Elizabeth Valmont

**11 Architectural Acoustics: Basic Theory and Perception**

**February 12, 2019**

**Tuesday**

Lecture

Introduction

Recommended Reading

Egan- Chapter1, pp 1-11

Homework

None

**12 Architectural Acoustics: Field Trip to the Music Center**

**February 14, 2019**

**Thursday**

Lecture

Site Visit

Recommended Reading

None

Homework

None

**13 Architectural Acoustics: Physics and Calculations**

**February 19, 2019**

**Tuesday**

Lecture

Sound Levels and Propagation

Recommended Reading

Egan- Chapter 1, 2

Homework

Homework #6

**14 Architectural Acoustics – Sound Isolation**

**February 21, 2019**

**Thursday**

Lecture

Sound Isolation and Calculations

Recommended Reading

Egan – Chapter 3

Homework

Homework #7

**15 Architectural Acoustics – Sound Absorption**

**February 26, 2019**

**Tuesday**



Lecture Sound Absorption and Calculations  
Recommended Reading Egan – Chapter 4  
Homework Homework #8

16 **Architectural Acoustics in Assembly Spaces  
February 28, 2019**

**Thursday**

Lecture Principles of Performance Acoustics  
Recommended Reading Egan – Chapter 3, 4  
Homework Homework #9

17 **Architectural Acoustics Applications –Guest Lecture  
March 5, 2019**

**Tuesday**

Lecture Acoustics Technology and Case Studies  
Recommended Reading None  
Homework None

18 **Preliminary Exam #2  
March 7, 2019**

**Thursday**

Lecture None  
Recommended Reading Section 2 Recap  
Homework None

**SPRING RECESS (March 10-17)**

### **Section 3: Building Systems (Mechanical, Electrical, Plumbing) Tony Cocea**

19	<b>Building Systems: Introduction to HVAC March 19, 2019</b>	<b>Tuesday</b>
	Lecture	HVAC (Heating, Ventilation, Air Cooling)
	Recommended Reading	Stein, Reynolds - Chapter 4
	Homework	None
20	<b>Building Systems: Introduction to Electrical Engineering March 21, 2019</b>	<b>Thursday</b>
	Lecture	Electrical Engineering
	Recommended Reading	Stein, Reynolds Chapter 14
	Homework	Homework #10
21	<b>Building Systems: Introduction to Plumbing Engineering March 26, 2019</b>	<b>Tuesday</b>
	Lecture	Gravity and Pressurized Piping Systems
	Recommended Reading	Stein, Reynolds – Chapter 10
	Homework	Homework #11
22	<b>Building Systems: Rainwater Harvesting Systems March 28, 2019</b>	<b>Thursday</b>
	Lecture	Rainwater Harvesting/ Graywater
	Recommended Reading	Stein, Reynolds – Chapter 8, 9
	Homework	Homework #12
23	<b>Building Systems: Basic Water Systems Design April 2, 2019</b>	<b>Tuesday</b>
	Lecture	Water Piping Systems Design
	Recommended Reading	Stein, Reynolds – Chapter 13
	Homework	Homework #13

24	<b>Building Systems: Water Reclamation Systems April 4, 2019</b>	<b>Thursday</b>
	Lecture	Water reclamation design concepts
	Recommended Reading	Stein, Reynolds – Chapter 13
	Homework	Homework #14
25	<b>Building Systems: Building Codes and Fire Safety April 9, 2019</b>	<b>Tuesday</b>
	Lecture	Building Codes/ Life Safety
	Recommended Reading	TBD
	Homework	None
26	<b>Building Systems: Fire Protection Systems Design April 11, 2019</b>	<b>Thursday</b>
	Lecture	Automatic Sprinkler Systems
	Recommended Reading	Stein, Reynolds – Chapter 9
	Homework	Homework #15
27	<b>Building Systems Recap –QA/ Session April 16, 2019</b>	<b>Tuesday</b>
	Lecture	None
	Recommended Reading	Session 3 Recap
	Homework	None
28	<b>Quiz #2 April 18, 2019</b>	<b>Thursday</b>
	Lecture	None
	Recommended Reading	Session 3 Material/ Homework + Notes
	Homework	None
29	<b>Field Trip- DLR Group LA Office April 23, 2019</b>	<b>Tuesday</b>
	Lecture	None
	Recommended Reading	None
	Homework	None



30 **No Class- Homework/Assignments Return**  
**April 25, 2019** **Thursday**

Lecture None

Recommended Reading None

Homework None

31 **FINAL EXAM**  
**May 2 2017 TBC** **Thursday**

