

Arch 515 Course Syllabus

COURSE : Arch 515 – ADVANCED ENVIRONMENTAL SYSTEMS

INSTRUCTOR : **Dr. Joon-Ho Choi**, PhD, LEED AP, Korean AE & QE
Assistant Professor of Building Science
 School of Architecture, University of Southern California
 Room #318, Watt Hall
joonhoch@usc.edu, 213-740-4576

GENERAL INFORMATION

Course Description

This course covers practical knowledge of passive and active environmental control strategies in heating, ventilating and air-conditioning (HVAC) systems, lighting and acoustic systems, building design performance and diagnostics, and human physiological factors related to building indoor environmental quality.

Course Goals and Intentions

The course is intended to give the students both a fundamental and practical knowledge of building environmental control systems and strategies in thermal, air quality, lighting, and acoustic conditions in large and small buildings. It also provides a working knowledge of many of the interrelated building systems necessary to support human physiological benefits: environmental comfort and health effects. Much of the material covered in this course will help to prepare the student in direct way for the professional building environmental design.

COURSE TIME : Thursday 6:30PM – 9:50PM

CLASSROOM : Watt Hall #212

OFFICE HOURS : By appointment

SCHEDULE of CLASSES: See the following pages.

ASSIGNMENTS : Assignment is due each Thursday before the class. It will be returned and discussed in class with solutions posted to the office board. Late homework will be marked accordingly: 20% discount per day on grade)

GRADING : Final grade averages shall be determined using a weighted average of all required work.

The weight distribution is as follows:

- Examinations (55%): Three examinations
 - Test #1: 15%
 - Test #2: 15%
 - Final : 25%
- Deliverables (40%): Homework (20%), Projects (20%)
- Extra Credits & Attendance (10%)

* A final grade shall be awarded using the following guidelines:

1. General rule:

- A. Excellent ~ weighted average $\geq 90\%$
- B. Superior ~ weighted average $\geq 80\%$ but less than 90%
- C. Medium ~ weighted average $\geq 70\%$ but less than 80%
- D. Inferior ~ weighted average $\geq 60\%$ but less than 70%
- F. Failure ~ weighted average less than 60% (Note: This is a firm cut-off average, not subject to the exception identified hereafter!)

2. Exception: The instructor reserves the right to adjust the low end weighted average cut-off score based upon the statistical distribution of the semester averages for A, B, or C final grades. For instance, if there is a large gap in the weighted averages at 88%, then the instructor may decide to award an A grade to all students above that value. This is done at the instructor's discretion and in no way should be constructed to mean that it will be done each and every semester. If a student wishes to earn a particular final grade then the student should focus on earning the minimum weighted averages described in the general rule.

EXTRA-CREDITS: There will be extra credit problems, assignments or participations. These extra problems or assignment to help those students who feel that there is a need to improve their grade by performing some extra work.

QUALITY: All deliverables shall be graded for quality and content, 60% and 40% respectively. See the instructor's memorandum: Quality Standards for Deliverables. Sloppy, illegible, disorganized deliverables are not acceptable for engineer work and shall negatively impact your course grade.

TEXTBOOK (required):

Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein and John S. Reynolds (11th Edition)

**Additional papers and handouts will be provided.*

Arch 515 SCHEDULE OF CLASSES (Tentative)

WEEK	DATE	LECTURE	CLASS	PROJECTS	ASSIGNMENTS
1	30-Aug	1	Introduction		#1
		2	Building and environment		
		3	Unit conversion 1		
2	6-Sep	4	Unit conversion 2		#2
		5	Building science		
		6	Thermal comfort		
3	13-Sep	7	PMV calculation / HOBO tutorial	#1: HOBO	#3
		8	Psychrometric chart 1		
		9	Psychrometric chart 2		
4	20-Sep	10	Heat transfer	#2: Research Proposal	#4
		11	Heating load calculation 1		
		12	Heating load calculation 2		
5	27-Sep	Test #1	Test #1		
		13	Cooling load calculation 1		
6	4-Oct	14	Cooling load calculation 2		#5
		15	Cooling load calculation 3		
		16	HVAC equipment and systems		
7	11-Oct	17	Environmental and physiological benefits 1	(#2: Proposal presentation)	#6
		18	Environmental and physiological benefits 2		
		19	Cost-benefit analysis 1		
8	18-Oct	20	Building scavenger (or Invited lecture)		#7
		21	Building scavenger (or Invited lecture)		
		22	Cost-benefit analysis 2		
9	25-Oct		Test #2		
		23	Duct system design 1		
10	1-Nov	24	HOBO presentation 1	(#1: HOBO Presentation)	
		25	HOBO presentation 2		
		26	HOBO presentation 3 / Comfort zone		
11	8-Nov	27	Duct system design 2		#8
		28	Pipe system design		
		29	Lighting design		
12	15-Nov	30	Daylighting design		#9
		31	Lumen methods		
		32	Solar shading		
13	22-Nov	(THANKSGIVING BREAK)			
14	29-Nov	33	Daylight calculation	(#2: Research outcome submission)	#10
		34	Acoustic environment		
		32	Noise and sound absorption		
15	6-Dec	36	Life safety system		
		37	Wrap up		
16	13-Dec	Final exam			