

# ARCH 615 - ELEMENTS OF ENVIRONMENTAL CONTROL SYSTEMS Syllabus

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Class Hours: T, Th 3:55 p.m. to 5:10 p.m.,  
(Spring 2010: January 19<sup>th</sup> - May 12<sup>th</sup> of  
2010)  
Classroom: FERM 303  
Office Hours: T, Th, 1:30 p.m. to 3:30 p.m.,  
or by appointment

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## **Textbook :**

W. Grondzik, A. Kwok, B. Stein, and J. Reynolds, 2010, *Mechanical and Electrical Equipment for Buildings*, 11<sup>th</sup> Edition, John Wiley & Sons, New York, ISBN 978-0-470-19565-9

## **Description:**

This course covers the theory and applications of building energy use, envelope design, shading analysis, heating and cooling systems, lighting design, building water supply, plumbing and drainage systems, electrical, acoustical, fire and lightning protection, life safety, transportation systems and construction materials, design opportunities, calculations, equipment selection, and component sizing as they relate to design.

## **Prerequisites:**

Students must be enrolled in an Architectural degree program, or have the permission of the instructor.

## **Homework:**

*Homework is due each Tuesday at the beginning of the class.* It will be graded and returned one week after and the solutions will be posted. Late homework will not be accepted.

## **Exams:**

There will be three or more exams that cover the material indicated. No make-up exams will be given for unexcused absences.

## **Final:**

There will be a comprehensive final given on the day assigned to this class by the registrar that will cover all the material presented in this class. The final will be open-book, open-notes. So I strongly urge you to organize your printed notes in a notebook as you go. Do not bring loose material to the test. Electronic copies of the class notes will be posted on the corresponding ARCH 615 class folder (*eLearning*) for purposes of distribution.

## **Helpful hints for doing well in this class:**

1. *Attend the lectures.* Copies of the lecture notes and all material covered in class will be posted at in the corresponding ARCH 615 folder of *eLearning* webpage. Keep your notes in a large, well-organized notebook. You will need to use it to study and during the exams. Try not to fall behind.
2. *Ask questions in class.* Make sure that you have copies of the solutions to the homework problems and that you understand how to solve them. The exams and final will primarily draw on these problems and the lecture notes.
3. *Drop-by during office hours and ask questions,* email to make an appointment for other hours. I will be using email to communicate to the class, so students in the class are required to obtain an email account and to use it.

4. You are allowed to work in groups to obtain a better understanding of the homework. However, **you are expected to turn-in your own homework that you have done**. Your performance on the tests will be based solely on what you know and therefore it is good idea to make sure you understand how to solve the homework problems by yourself.

### Grading Policy:

Exam #1.....	17%
Exam #2.....	17%
Final Exam.....	30%
Homework.....	<u>36%</u>
	100%

Grade $\geq$ 93%	<b>A</b>	Excellent performance on all work.
93 > Grade $\geq$ 82%	<b>B</b>	Good performance on all work, excellent performance on portions of the work
82 > Grade $\geq$ 70%	<b>C</b>	Satisfactory completion of all work, good performance on some work. Average performance
70 > Grade $\geq$ 60%	<b>D</b>	A passing effort however score is below average for the class.
60 > Grade $\geq$ 0%	<b>F</b>	Unsatisfactory performance, not a passing grade.

### Tentative Outline of Course Material

Topic	Subject	Topic	Subject
1	Introduction, energy sources, etc.		Lighting applications, daylighting.
2	Comfort, climate and design strategies, sites.		Electricity, basics and measurement.
3	Heat flow, moisture, infiltration, psychrometry.		Electric systems.
4	Calculating heating and cooling energy use.		Conduit, wiring systems.
5	Detailed heat gain calcs., simulation, passive.		Electrical service.
6	Systems and equip. for heating and cooling.		Electric wiring design.
7	Refrigeration systems, IAQ, air filters.		Water and waste water.
8	HVAC systems in large buildings.		Bathroom design.
9	HVAC distr. sys., hydronic and forced-air sys.		Solid Waste.
10	Illumination: physics of light.		Fire safety, lightning protection.
11	Light and sight.		Acoustics, sound theory, room acoustics
12	Lighting quantity, quality, color.		Acoustics, noise reduction, sound isolation
13	Light sources		Transportation Systems
14	Lighting design.		Economic Calculations

**COPYRIGHT NOTICE:** The handouts in this class contain material that has been photocopied with permission from the publisher and are therefore copyright. "Handouts" includes all material generated for this class, which includes, but is not limited to: syllabi, quizzes, exams, in-class notes and handouts, review sheets and assignments. Therefore, the copyright material in this class should not be copied without prior permission from the instructor.

**NOTE ABOUT PLAGIARISM:** Plagiarism consists of the passing off as one's own ideas, words, writings, etc., which belong to another. In accordance to this definition you are committing plagiarism if you copy the work of another person and turn it in as your own. If you have questions about plagiarism please consult the Texas A&M University Student Rules book, under the section "scholastic dishonesty".

"An Aggie does not lie, cheat or steal or tolerate those who do." [www.tamu.edu.aggiehonor](http://www.tamu.edu.aggiehonor)

**NOTE FOR STUDENTS WITH DISABILITIES:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodations of their disabilities. If you believe you have a disability requiring accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Student Services Building. The phone number is 845-1637.

**NOTE ABOUT ABSENCES:** The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will

*be given and assignments will be due. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Students are advised to consult the University regulations for a list of authorized absences.*