

**ARCH 643 – Software Development for Building Design – Spring 2010**  
**Professor Charles H. Culp, P.E., Ph.D., LEED-AP, FASHRAE**

Class: Monday Evening – 11:30 AM – 12:20 PM M-W, 11:30 to 1:20 Friday  
Location: ArchA-323 M-W, ArchA 403, Friday

Office Hours: Tues., Thurs. 11:00 PM – 12:30 PM  
Mon., Wed. 12:30-2:00 or by appointment.

E-mail or phone to make an appointment for other times.

I will make myself available during evenings and/or week-ends if needed.

Dr. Culp can be reached in the Architecture Department, Rm A-443.

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**Required Text:** Notes provided by instructor

**Goal:** Introduce students to software simulation technologies and methods to achieve low energy use in residential and commercial buildings.

**Catalog Description:** Software simulation methods for studies of low energy buildings including design, construction, operation and indoor air quality, with an emphasis on understanding the performance of heating and cooling systems with their interaction with the envelope and occupants.

**Course Description:** Students will develop an in-depth understanding of how to perform software simulations of low energy usage in buildings while maintaining acceptable comfort and indoor environmental quality. The course will cover performance of heating and cooling equipment, and air moving methods. After which, a specific building type will be selected as the semester project and the class will be divided into teams. Each team will complete a design of the building with a functioning high performance HVAC system. When appropriate, a site plan will also be completed. The building will be designed to minimize the energy use by applying low energy methods and technologies. Students will complete an analysis of the building performance and energy efficiency. Multidisciplinary teams may be formed consisting of Architecture and Engineering students.

**Prerequisite:** Arch 633, 635 or permission of instructor

**Requirements:** Access to a computer for completing drawings and running simulations is required. Free software (Energy Plus, eQuest) will be provided by the US Department of Energy. Sketch-Up and Revit 2009 (with MEP and Structures) will also be used in the class.

**Objectives:** Develop skills in working with multidisciplinary teams on integrating architectural design with engineering design. The project teams will learn to design an “optimal” low energy system using current state-of-the-art or state-of-the-future systems.

**Homework:** Homework and/or research assignments may be given weekly. These will be returned and discussed in class. Late homework will be marked down 10% per day late. Late homework will not be accepted after the answers are issued / discussed.

**Tests / Quizzes:** Tests may be given on specific subject matter covered in lectures.

**Final:** There will be a presentation developed in which the student designers (or design teams) will present and defend their designs. A final design document which includes the performance analysis is also required.

**Project:** Grading on the team project will be based on participation in the design team, level of energy reductions achieved, ability of the individuals to defend the designs

**Attendance:** Attendance is required. Class discussions will cover material on low energy use systems which has not yet been organized in a book. The final review for the design presentations will be scheduled at the end of the semester and may need to be in an evening. We may need to schedule other meetings / reviews as required.

**Extra Credit:** Attendance is needed since you will be working in teams. I give extra credit for class attendance. Five (5) consecutive days of attendance will earn 1 point (of up to 5). You can earn up to 5 extra points, which can make a difference of one letter grade.

**Grading Policy:**

Tests	10%
Homework / Reports	20%
Selected Presentations	10%
Final Written Project	35%
Final Presentation of Project	25%
<u>Extra Credit</u>	<u>5%</u>
Total	105%

**Grade Earned:**

90% – 105%	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
<u>00% - 59%</u>	<u>F</u>

### **Helpful Hints for Doing Well in this Class**

1. **Read assigned material before class.** Reading material will be assigned to assist you in building your energy use references.
2. **Turn in homework on-time.** Working the homework will bring out areas that you understand and that you may need help in.
3. **Attend the lectures.** Copies of the lecture notes and all material covered in class will be available on the class Web-CT site. 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.
4. **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 the material used in these problems and the lecture notes.
5. **Drop-by during office hours and ask questions.** E-mail or phone to make an appointment and drop-by during other hours. I will make myself available during evenings and/or week-ends if needed. I will be using Web-CT e-mail to communicate to the class, so students in the class are required to check their Web-CT account daily.
6. **You are encouraged 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 career performance on the tests will be based on what you know and therefore it is good idea to make sure you understand how to solve the homework problems by yourself.
7. **I use the Aggie Honor System for tests.** You will certify that you have completed the test by yourself. You are expected to perform all work on the tests by yourself.

**COPYRIGHT NOTICE:** The handouts in this class may 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”.*

**AGGIE HONOR CODE:** *Please refer to the new University’s Honor System web site (<http://www.tamu.edu/aggiehonor/>). This code has detailed policies and procedures on how professors need to handle instances which violate the Aggie Honor Code. Please read and understand the information.*

*“An Aggie does not lie, cheat, steal or tolerate those who do.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the examinations, research papers and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.*

*The following pledge applies to all course work, assignment and examinations at Texas A&M University. You may be required to sign this pledge on assignments. “On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work.”*

**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.