CE 397 Field Measurements: Building Energy and IEQ
Spring 2012

The University of Texas at Austin
Department of Civil, Architectural, and Environmental Engineering

Course Numbers and Credits: CE 397(15825) 3 credits

Course Website: http://www.ce.utexas.edu/prof/Novoselac/classes/CE397

Classroom and Time: ECJ 9.236, Tuesday and Thursday 9:30 AM - 11:00 AM
(Some classes will be at PRC labs at the time that works for all students)

Prerequisites: Graduate standing students. Undergraduate students need permission of instructor.

Instructor: Dr. Atila Novoselac
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http://www.ce.utexas.edu/prof/Novoselac

Office Hours: Tuesday and Thursday, 11:00 AM - 12:00 PM or by appointment. I have an open door policy – if my office door is open, I will see students without an appointment. If I am busy, we will schedule a convenient time for both of us.

Course Catalog Description: Measurement of building energy and indoor environmental quality (IEQ) parameters relevant for building commissioning and forensic engineering studies. Introduction to and use of measuring techniques and instrumentation for: electric power, heat transfer, fluid flow, pressure, lighting, surface and air temperature, relative humidity, and concentration of particulate and gaseous pollutants. Experimental design, quality control and data processing.

Course Objectives:

1) Gain an appreciation for the design and completion of relevant field and laboratory measurements to understand: building energy performance, indoor environmental quality, and associated determinants in buildings.
2) Learn about measurement techniques, instrumentation, and complexities associated with their use (including accuracy and interference issues).
3) Obtain hands-on experience (in lab and field) with a number of basic instruments used in field investigations of buildings.
4) Analyze data from field and laboratory measurements and assess performance of buildings and their components.

Textbook:
There will not be a required textbook for this course. Instructor will provide students with hard or electronic copies of reading materials.

Topics:

1. Course introduction and lab and field work safety	1 wk
2. Specifics of field and laboratory measurements	1 wk
3. Experimental error & quality control	2 wks
4. Velocity, flow, and pressure measurements	2 wks
5. Temperature, humidity, and heat and moisture flows	2 wks
6. Measurement of particulate matter	1 wk
7. Measurement of gaseous contaminants	1 wk
8. Electric power measurement	1 wk
9. Signal processing and data acquisition	1 wk
10. Sample collection and analysis	2 wks
	Total 14 wks

Grading:

Midterm Test	25%
Classroom Participation	5%
Homework Assignments	40%
Final Project & Presentation	30%
	100%

Course Letter Grades: (Numerical Grades for graduate and undergraduate students)

90-93; 94-100	A-, A
80-83; 84-86; 87-89	B-, B, B+
70-73; 74-76; 77-79	C-, C, C+
60-63; 64-66; 67-69	D-, D, D+
< 60	F

Personal Problems:
If you have illness or personal problems that will affect your performance during the course of the semester, please let me know as soon as possible. "After the fact" provides little protection unless there are extreme circumstances. I have an answering machine and an e-mail address if you need to get in touch with me after hours. Do not hesitate to use them.

Academic Honesty:
Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site http://www.utexas.edu/depts/dos/sjs/.

Privacy – Web Based Class Sites:
Web-based, password-protected class sites may be associated with all academic courses taught at the University. Syllabi, handouts, assignments and other resources are types of information that

may be available within these sites. Site activities could include exchanging email, engaging in class discussions and chats, and exchanging files. In addition, electronic class rosters will be a component of the sites. Students who do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1. For information on restricting directory information, see: http://www.utexas.edu/student/registrar/catalogs/gi00-01/app/appc09.html.

Students with Disabilities:
The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. Any student with a documented disability (physical or cognitive) who requires academic accommodations should contact the Services for Students with Disabilities area of the Office of the Dean of Students at 471-6259 as soon as possible to request an official letter outlining authorized accommodations. For more information, contact that Office, or TTY at 471-4641, or the College of Engineering Director of Students with Disabilities at 471-4321.

Dropping the Course:
From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 13th through the university's academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor. After the academic drop deadline has passed, a student may drop a course only with Dean's approval, and only for urgent, substantiated, non-academic reasons.

Course Evaluations:
Each student will be given the opportunity to evaluate the course using the standard course/instructor evaluation form at the end of semester.

Lab and Field Work:
A significant portion of classes (approximately 30%) will be held in laboratories and a test house located in PRC. In these classes students will learn to use building energy and indoor environmental quality instrumentation. Also, the course will include field work relevant to commissioning or forensic engineering.

Computer Usage:
Some homework assignments and the final project will require extensive use of computers. Basic knowledge of data processing, regression analysis, and graphing software (Excel, TecPlot, Origin, Stata, Matlab, or any other) is expected.

Project:
There will be one project accounting for 30% of the course final grade. It will include field measurement, results processing, and analysis. The final project will include student project presentations during the final week of classes.

TENTATIVE COURSE SCHEDULE

Date	Topics	Due date for
01/17	Course introduction examples and terminology	
01/19	Specifics of field and laboratory measurements	
01/24	No class (ASHRAE Conference) - make-up will be the field work	
01/26	Laboratory and field work safety and logistics	
01/31	PRC lab and test house class	
02/02	Experimental error	
02/07	Error analysis	
02/09	Quality control	HW1
02/14	Velocity and speed measurements	
02/16	Pressure and flow measurements 1	
02/21	Pressure and flow measurements 2	
02/23	Temperature measurement	HW2
02/28	Relative humidity measurement	
03/01	Heat flows measurement	
03/06	Moisture flows measurement	
03/08	Measurement of particulate matters 1	
03/20	Measurement of particulate matters 2	HW3
03/22	Measurement of gaseous contaminants 1	
03/27	Measurement of gaseous contaminants 2	
03/19	Electric power measurement 1	
04/03	Electric power measurement 2	
04/05	Final project assignment	HW4
04/10	Midterm test	
04/12	Signal processing and data acquisition 1	
04/17	Signal processing and data acquisition 2	
04/19	Sample collection and data analysis 1	Final Pr. Prelim. Res.
04/24	Sample collection and data analysis 2	
04/24	Sample collection and data analysis 2	
05/21	Course review	
05/03	Project presentations	Final Project