

BBE/HSG 4413: A Systems Approach to Residential Construction

Spring 2017

Bob Seavey / Kevin Janni

Course Syllabus

Course Title: A Systems Approach to Residential Construction

Credits: 4 credits

Day/Time: Tuesdays & Thursdays; 3:00 – 4:55 PM

Meeting Room: 395 McNeal Hall

Instructors: Bob Seavey 624-3028 (please leave a message)
202 Kaufert Lab seave001@umn.edu

Kevin Janni 625-3108 (please leave a message)
204 BAE kjanni@umn.edu

Office Hours: Seavey 2:00p – 2:45p Tuesday & Thursday; and by appointment
Janni: by appointment

Description: This course begins with an introduction to residential construction, key building materials, and housing terminology. It will cover the construction process, including basic building science concepts and important tips for a designing, building, and maintaining an efficient, durable structure and a healthy indoor living environment.

The second portion of this course will investigate the dynamic and interrelated issues of energy, moisture control, and indoor air quality in residential buildings. The emphasis is on design, construction, and operational aspects of the house to provide an energy-efficient, durable structure and a healthy living environment. The course will build skills in the following areas:

- fundamentals of heat, air, and moisture transport
- strong understanding of psychrometrics
- how to perform building energy calculations
- solid understanding of basic building materials and assemblies
- overview of residential mechanical systems
- principles for good indoor air quality

Texts: Canadian Home Builder's Association's Builder's Manual (CMHC)
Guide to the Performance-Built House. 1993 (PBH)

Supplemental*: Moisture Control Handbook by Lstiburek & Carmody. 1994
EEBA Builders Guide for Cold Climates by Lstiburek. 2006

Grading: The course grades will be broken down as follows:

Exam 1: Basics of Residential Construction	20%
Exam 2: Building Envelope	20%
Exam 3: Mechanical Systems	20%
Assignments and Quizzes	35%
Participation	5%

Exams: All exams will be closed book. Only in an emergency will a student be allowed a make-up exam. If you have such an emergency, you must notify the lead instructor prior to the exam.

Assignments: The assignments and projects are due at the beginning of the specified class period. Assignments turned in after this time will be given one half of the original grade. Assignments turned in more than one week after the due date will not be graded, without prior permission.

Grades: The final letter grades will be based on the following percentages:

94-100	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C
70-73	C-
67-69	D+
60-66	D
0-59	F

Students taking this course for graduate credit will be required to complete an additional project developed in consultation with the instructors.

Policies: Attendance: You are expected to be in class from 3:00 to 4:55 on Tuesdays and Thursdays; this means coming to class on time and staying to the end. You should read through reading material on a topic prior to class; then read and study it again after it has been discussed in class. If you choose to be absent, it is your responsibility to obtain handouts and information about material covered during class from fellow students.

Respect: You are expected to be attentive during class, ask questions if you do not understand something, and to offer your opinion. You are also expected to listen respectfully to other students and to the instructor. Racism, sexism, homophobia, classism, ageism and other forms of bigotry are inappropriate to express in this class.

Incompletes: Incompletes will be given only in the case of a prolonged illness. Exceptions will be rare and will be at my discretion. Procrastination or failure to be aware of assignments due because you have not attended class are not acceptable rationale for receiving an incomplete.

Late Assignments: Not reading the syllabus or failure to be aware of assignments due because you have not attended class will not be accepted as an excuse for late assignments.

Computer use in class:. Connection to the internet during class time is prohibited.

Cell Phones: Phone use in class is prohibited. Please turn off your phone before class begins.

Accommodations: If you have any disability that might affect your performance in this class, you are encouraged to speak with me at the beginning of the term.

Academic Integrity: Students are responsible for maintaining academic integrity by submitting his or her own original work. All suspected cases of academic dishonesty will be vigorously pursued.

Moodle

A Moodle website will be used for this class. You can access the website once it is ready by going to <http://myu.umn.edu> , go to myU Home and click on the Sign-In link. We will announce in class when the website is available.

In this class, our use of technology will sometimes make students' names and U of M Internet IDs visible within the course website, but only to other students in the same class. Since we are using a secure, password-protected course website, this will not increase the risk of identity theft or spamming for anyone in the class. If you have concerns about the visibility of your Internet ID, please contact me for further information.

<i>Class Date</i>	<i>Topics</i>	<i>Assigned Reading</i>
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Section 1: Introduction to Residential Construction

Week 1 January 17 & 19	Course Overview, Construction Process, Excavation & Concrete,	CMHC Chapt 1 & 2
Week 2 January 24 & 26	Footings - Foundations & Slabs	CMHC Chapt 3 & 7
Week 3 January 31 & Feb 2	Wood Framing Basics Floor Framing	CMHC Chapt 4, 8 & 9
Week 4 February 7 & 9	Wall Framing Ceiling Framing	CMHC Chapt 10 & 11
Week 5 February 14 & 16	Attic and Roof Assembly Wall Sheathing & Cladding	CMHC Chapt 12 & 14
Week 6 February 21 & 23	Windows & Doors Mechanical System – Installation	CMHC Chapt 15 & 19
Week 7 Feb 28 & March 2	Insulation / Air and Vapor Exam #1	

Exam 1 Thursday, March 2

Section 2: Building Science and Building Enclosure

Week 8 March 7 & 9	House as a System, Energy: Basics	Chapter 1.1 (PBH) Chapter 2.1 (PBH)
Spring Break – March 14 – 18		
Week 9 March 21 & 23	Energy: Heat Transfer Moisture Transport Psychrometrics Wood Moisture Relationships	Chapter 2.3 & 2.4 (PBH) Chapter 2.5 & 2.6 (PBH)
Week 10 March 28 & 30	Indoor Air Quality Foundation Drainage & Insulation	Chapter 1.8 (PBH) Chapter 3 (PBH)

Week 11 Windows, Doors & Skylights Chapter 3.5 (PBH)
April 4 & 6

Exam 2 Thursday, April 6

Section 3: Mechanical Systems Professor Kevin Janni

Week 12 Mechanical Systems Overview Chapter 4.1 (PBH)
April 11 & 13

Heating Systems

Week 13 Cooling & Ductwork
April 18 & 20 Indoor Air Quality & Ventilation

Week 14 Ventilation & Fans
April 25 & 27 Filtration & Dehumidification
Water Heating, Lights & Appliances Chapter 1.7 (PBH)

Week 15 Review – Mechanical Systems
May 2 & 4

Exam 3 Thursday, May 4

Have mastered a body of knowledge and a mode of inquiry

Students in BBE / HSG 4413 are required to learn the basic principles of building science and to apply these principles to assessing the performance of the building. Students will be required to master the principles of heat transfer and psychrometrics. They will need to show how calculations of these parameters can be used to explain building performance.

Assessment will be through assignments, quizzes, exams and special projects. The basic steps are highlighted in the graded assignments. Higher level problems and interpretations are posed in the quizzes and exams. Questions such as relative humidity change with air temperature increase and heat loss through a particular wall section are examples of these types of questions.