

Chris Roberts

Winter 2013

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Introduction

Application of building science theory to building enclosure, examination of building elements and the application of building components to specific problems in architecture. This course focuses on the application of building science principles to building structures and enclosures. It examines various types of building elements in manners appropriate to their intended functions and performances. The understanding of building enclosures requires a familiarity with individual components that make up the total structure. Each component interacts and interrelates with one another. This course examines the function and configuration of building components from footings to wall and roofing systems.

Objectives

1. To develop a sound understanding of building envelope components and their influence on building performance, design intent and sustainability.
2. To develop an understanding of the building process from soils investigation and foundation design to the design and execution of building enclosure systems.
3. To become familiar with the basic requirements of the National and Alberta Building Code that most impact design including rules for exiting, handicap accessibility, fire ratings and separations.
4. To acquire necessary skills to read, design and illustrate certain architectural details as an effective means of communication.

The following CACB Student Performance Criteria will be covered in this course at a primary level (other criteria will be covered at a secondary level) B6: Life Safety Systems; B9 Building Envelopes; B11 Building Materials; C1 Detailed Design Development; C2 Building Systems Integration; C3 Technical Documentation.

Teaching Approach

The first part of this course is presented in a lecture format. The second half of this course will consist of a combination of lectures and classroom discussions focused on the application of these systems to a student's specific studio project.

Content: Topic Areas & Tentative Class Schedule

Building Code requirements; Soils, Footings and Foundations; Masonry, Curtain Wall, Metal & Metal Composite Wall Systems; Roofing Systems; High Humidity Considerations; Insulation Types; Drawing Conventions.

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| Week 1 | Introduction, Geotechnical Overview |
| Week 2 | Foundation Design Overview Building Code Overview Parts 3&7 |
| Week 3 | Building Code Overview, Interconnected Space & Accessibility Requirements Air & Vapour Barriers/Temperature Gradients, High Humidity Considerations |
| Week 4 | Masonry Panelized (metal, composites etc.) Cladding Systems Overview |
| Week 5 | Metal/Metal Composites Details Glazed Wall Systems Overview - Curtain Wall, KallWall, Channel Glass etc. |
| Week 6 | Curtain Wall Details Floor Plan Building Code Review - Classroom Crit |
| Block Week | |
| Week 7 | Exam Tune-up Mid Term Exam |
| Week 8 | Classroom Crit, Building Code Review 'Flat' Roofing Systems Overview |
| Week 9 | Glass Selection Criteria Drawing Conventions |
| Week 10 | Fire Ratings, Separations & Fire Walls Insulation Types, High Humidity Considerations |
| Week 11 | Classroom Crit |
| Week 12 | Classroom Crit |
| Week 13 | Classroom Crit |

Means of Evaluation

Proficiency in the course is demonstrated by the student's ability to analyze and detail building assemblies and discuss the merits and deficiencies of the various materials for particular applications.

Final evaluation is based on the following:

Mid Term Exam 30%

Studio Project 70%

Grading Scale

| Letter Grade | 4-Point Scale | 4-Point Range | Percent | Description |
|--------------|---------------|---------------|----------|---|
| A+ | 4.00 | 4.00 | 92.5-100 | Outstanding - evaluated by instructor |
| A | 4.00 | 3.85-4.00 | 85-92.49 | Excellent - superior performance showing comprehensive understanding of the subject matter |
| A- | 3.70 | 3.50-3.84 | 80-84.99 | Very good performance |
| B+ | 3.30 | 3.15-3.49 | 76-79.99 | Good performance |
| B | 3.00 | 2.85-3.14 | 73-75.99 | Satisfactory performance |
| B- | 2.70 | 2.50-2.84 | 70-72.99 | Minimum pass for students in the Faculty of Graduate Studies |
| C+ | 2.30 | 2.15-2.49 | 66-69.99 | All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements. |
| C | 2.00 | 1.85-2.14 | 63-65.99 | |

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|----|------|-----------|----------|--|
| C- | 1.70 | 1.50-1.84 | 60-62.99 | |
| D+ | 1.30 | 1.15-1.49 | 56-59.99 | |
| D | 1.00 | 0.50-1.14 | 50-55.99 | |
| F | 0.00 | 0-0.49 | 0-49.99 | |

Readings

For this course, all required study material will be provided by the Instructor. It is suggested that students become familiar with the building science papers published on the Canadian Building Digest, Building Science Corporation and the Alberta Association of Architects websites.

Canadian Building Digest, Institute for Research in Construction, National Research Council of Canada @ www.nrc.ca/irc/cbd

Building Science Corporation @ www.buildingscience.com

AAA Website, Continuing Education, CMHC & OAA Articles @ www.aaa.ab.ca

Notes:

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor.
2. It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. - <http://www.ucalgary.ca/drc/node/46> Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.
3. Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when: (a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test), (b) parts of the work are taken from another source without reference to the original author, (c) the whole work (e.g., an essay) is copied from another source, and/or, (d) a student submits or presents work in one course which has also been submitted in another course (although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual

honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

4. Information regarding the Freedom of Information and Protection of Privacy Act (<http://www.ucalgary.ca/secretariat/privacy>) and how this impacts the receipt and delivery of course material
5. Emergency Evacuation/Assembly Points (<http://www.ucalgary.ca/emergencyplan/assemblypoints>)
6. Safewalk information (<http://www.ucalgary.ca/security/safewalk>)
7. Contact Info for: Student Union (<http://www.su.ucalgary.ca/page/affordability-accessibility/su-structure/contact-info>); Graduate Student representative (<http://www.ucalgary.ca/gsa/>) and Student Ombudsman's Office (<http://www.su.ucalgary.ca/page/quality-education/academic-services/student-rights>).