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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.

### **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, desk crits, 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.

Week 1 Introduction,  
Geotechnical Overview

Week 2 Foundation Design Overview  
Building Code Overview Parts 3 – fire ratings & separations, exiting, occupant loads, etc.

Week 3 Building Code Overview – spatial separations, interconnected space, handicap accessibility, etc.  
Basic Building Envelope Theory - air & vapour barriers, temperature gradients/dew points, high humidity considerations, etc.

Week 4Masonry  
Glazed Wall Systems Overview - curtain wall, structural glazing, Kalwall, etc.

Week 5 Panelized Cladding Systems Overview – metal panels, flat & composite, insulated. Cement composite, precast, etc.  
'Flat' Roofing Systems Overview – exposed & inverted membranes, green roofs.  
**Technical Team Review**

Block Week

Week 6 Floor Plan Building Code Review - Classroom Crit  
Exam Tune-up

Week 7**Mid Term Exam** – Open Book/Electronic Devices Permitted  
Soped/Complex Roofing Overview

Week 8Insulation Types  
Glass Selection Criteria

Week 9Drawing Conventions  
Desk Crits  
**Technical Team Review**

Week 10 Desk Crits

Week 11 Desk Crits

Week 12 Desk Crits

Week 13 Desk Crits  
Final Project Due – 11x17 Hard Copy

### **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	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.49	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	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	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

## 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](http://www.nrc.ca/irc/cbd)

Building Science Corporation @ [www.buildingscience.com](http://www.buildingscience.com)

AAA Website, Continuing Education, CMHC & OAA Articles @ [www.aaaab.ca](http://www.aaaab.ca)

## CACB Student Performance Criteria

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.

### 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. Submissions must come from an official University of Calgary ([ucalgary](mailto:ucalgary)) email account.
2. Academic Accommodations. Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their Instructor or the designated contact person in EVDS, Jennifer Taillefer ([jtaillef@ucalgary.ca](mailto:jtaillef@ucalgary.ca)). Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/)
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>).