UNIVERSITY OF CALGARY
SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE

Instructor: Dr. C. Hachem-Vermette **Winter 2022**
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Design Decisions: Energy performance (ARCH 690)

Target audience: MArch

Course Description

Buildings and the built environment are responsible for significant portion of Canada's total energy consumption, and related Greenhouse Gas (GHG) emissions. To reduce the negative impact of buildings on the environment, design decisions should be carefully considered, at the early design stages. Such design decisions include building massing and form, envelope design (opaque and transparent), materials employed, and others. Architects are usually responsible for such design decisions, and thus possess the means to produce environmentally responsible buildings.
This course aims at train students to critically analyze the impact of their design decisions on energy performance for building operations.

Learning Outcomes:

This course will enhance the understanding of the integrated design process and will highlight the effect of building design on building energy management. By the end of this course students will be able to:

- Assess the main effect of building design, including massing, envelope design, materials employed on heat transfer through the envelope, and heating and cooling loads.
- Design building integrated photovoltaic integrated systems and perform simple calculations of electricity by different types of photovoltaic systems.
- Develop analytical and critical standpoint for the design of environmentally sustainable buildings.
- Develop creative design methodologies for building envelope that integrate building technologies together with aesthetical and functional aspects.

Teaching Approach

The course will consist mostly of individual and group project tutorials and desk crits. Lectures and workshops will also be organized to support students' projects. The workshops will cover development of building design decisions to support energy performance analysis (employing computer-based design aids).

Content: Topic Areas and preliminary schedule

W1	Introduction to high energy performance buildings. Overview of expected work in the course. Introducing first assignment.

W2	Desk Crits
W3	Desk Crits
W4	Desk Crits
W5	— Assign 1 submission — Students' presentation: Assignment 1
W6	Block week
W7	Brief introduction to methods of estimation of energy consumption and potential generation from PV systems.
W8	Desk crits
W9	Block Week
W10	Desk Crits
W11	Desk Crits
W12	Desk Crits
W13	Student's Final presentation

Student work

The student work will be conducted in teams of two students. It contains two assignments:

1) Assignment and presentation (50%).
2) Analytical report of energy performance and impact of architectural design on the performance (50%).

Grading Scheme

Grading will be based on the following scale:

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - as evaluated by
A	4.00	3.85-4.00	90-94.99	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	

Notes:
A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

Readings

A list of readings related to each topic will be posted regularly on D2L.

Important 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) 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). 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/
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. Appeals: If a student has a concern about the course, academic matter, or a grade that they have been assigned, they must first communicate this concern with the instructor. If the concern cannot be resolved

with the instructor, the student can proceed with an academic appeal, which normally begins with the Faculty: http://www.ucalgary.ca/provost/students/ombuds/appeals

5. Information regarding the Freedom of Information and Protection of Privacy Act (https://www.ucalgary.ca/legalservices/foip)
6. Emergency Evacuation/Assembly Points (http://www.ucalgary.ca/emergencyplan/assemblypoints)
7. Safewalk information (http://www.ucalgary.ca/security/safewalk)
8. Contact Info for: Student Union (https://www.su.ucalgary.ca/contact/); Graduate Student representativehttps://gsa.ucalgary.ca/about-the-gsa/gsa-executive-board/) Student Union Wellness Centre: https://www.ucalgary.ca/wellnesscentre/; Library Resources: http://library.ucalgary.ca/ and Student Ombudsman's Office (http://www.ucalgary.ca/ombuds

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): A1. Critical Thinking Skills; A6. Human Behaviour, B3. Site Design, and B4. Sustainable Design. *(see CACB SPC matrix for further details)*

Contact & Office Information

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Please contact instructor with any questions or concerns. Meetings by appointment.