1. COURSE OBJECTIVES

1) Introduce students to the principles of building Science
2) Analyse and design the building envelope components from a building science perspective

2. COURSE SPECIFIC POLICIES

“The instructor and university reserve the right to modify elements of the course during the term. The university and instructor may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on the changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.”

1. All lectures and tutorials are mandatory.
2. All email exchanges are to be via the course dedicated email CE4BP4@mcmaster.ca using a McMaster University e-mail account. Emails from non-McMaster accounts will not receive a reply.
3. We will not check nor reply to emails sent via Avenue.
4. Students are required to evaluate their peers for their contribution to the assignments and project. If there are any problems, communication/delivery or other problems, among group members, you are expected to first resolve it among yourselves. If the problem is not resolved within one week, the group is expected to contact the TA for assistance. If the problem is not resolved, the group members need to contact me. Assignments’ and Project Mark will be adjusted to reflect the contribution of the students.
5. To pass the course, students must complete and receive a minimum of 50% on the Assignments, Term tests, and Project portion of the course

Recommended Reference Material
It is not necessary to purchase a textbook in order to follow the course, as notes will be provided. Students are encouraged to find their own self-study materials. Useful background reading includes:

**Avenue**

[http://avenue.mcmaster.ca/](http://avenue.mcmaster.ca/)

Lecture notes; Additional notes and Assignments will be posted on Avenue. Students are expected to check and read all the material posted on avenue.

**Assignments/Tutorials**

During the course of this term, students are expected to work independently and in groups. Students are placed in a group of 4 to work together during tutorial time. Six assignments will be given during the term to assist in understanding the course material. Students are expected to work together on the assigned problems during tutorial time.

Assignments will be posted on avenue Wednesday 5:00 pm right before the start of the tutorial. During the tutorial time, The TA will solve problems on the board that are similar to the assigned problems. On Thursday at 5:00 pm, i.e. before the start of the tutorial, students must electronically submit their assignment to the course dropbox on Avenue. During the tutorial time, the students are then expected to discuss their solutions and hand in one copy per group at the end of the Thursday tutorial.

It is mandatory that students attend the tutorials. Students that do not submit an electronic copy of their assignment or that do not attend the tutorial(s) will receive a zero on the assignment. If you receive a zero on more than 2 assignments (1/3 of the total number of assignments), you will receive a failing grade for the course.

Please note that the assignment needs to have the group number and the name and student no of the group member that attended the Thursday tutorial written at the top of the 1st page.
## 3. SCHEDULE

| WEEK 1-2 | Introduction to building Science  
Building Envelope components & functions | Assignment 1 – Introduction to the group project |
| WEEK 3-4 | Heat transfer through the building envelope | Assignment 1, 2 & 3 / Project / Term Test 1 |
| WEEK 5-6 | Principle of mass transfer, water transfer through the building envelope | Assignment 3, 4 & 5 / Project |
| WEEK 7 | Heat & Moisture modelling tools and techniques | Assignment 6 / Project |
| WEEK 8 | Codes and regulations | Assignment 6 / Project |
| WEEK 9 | Building energy consumptions | Assignment 6 / Project / Term Test 2 |
| WEEK 10-11 | Energy modelling tools and techniques  
Lighting fundamentals  
Building performance – durability, energy efficiency, sustainability, etc. | Project |
| WEEK 12 | Problems of heat and moisture transport - freeze-thaw, condensation, corrosion, rot, mould, dissolution, etc. | |
| WEEK 13 | LEED - Leadership in Energy & Environmental Design | |

Depending on the progress of the course either additional topics may be covered, or some topics may not be covered. The order of topic shown may change.

## 4. ASSESSMENT OF LEARNING

<table>
<thead>
<tr>
<th>ASSESSMENT OF LEARNING</th>
<th>WEIGHT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments (Individual &amp; Group)</td>
<td>12</td>
</tr>
<tr>
<td>Term Tests (Feb 13 &amp; March 19 – 5:30 to 7:30 pm – ABB 164 &amp; 165)</td>
<td>58</td>
</tr>
<tr>
<td>Group Project</td>
<td>30</td>
</tr>
<tr>
<td>Bonus (Class attendance &amp; group participation)</td>
<td>3</td>
</tr>
</tbody>
</table>

To pass the course, students must complete and receive a minimum of 50% on the Assignments, Term tests, and Project portion of the course.

Details of the group project will be discussed later this week.

## 5. LEARNING OUTCOMES

1) understand the fundamental modes of heat transfer; conduction, diffusion, convection and radiation,
2) understand the fundamental modes of dry and moist air transfer; convection,
3) understand the fundamental modes liquid/moisture transfer; sorption and diffusion,
4) know the building envelope components and functions,
5) assess the performance, durability, and code requirements for building envelope components,
6) know the various building systems,
7) model the heat and moisture transfer in building envelope, 
8) model the energy consumption of buildings, and 
9) be familiar with LEED

6. COMMUNICATIONS

It is the student’s responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student’s designated primary e-mail account via their “@mcmaster.ca” alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student’s @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.
### 7. POLICIES

#### ACADEMIC INTEGRITY

You are required to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](https://www.mcmaster.ca/academicintegrity), located at [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

The following illustrates only three forms of academic dishonesty:

1. Plagiarism. e.g. the submission of work that is not own or for which other credit has been obtained
2. Improper collaboration in group work
3. Copying or using unauthorized aids in tests and examinations.

#### PROTECTION OF PRIVACY ACT (FIPPA)

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and the posting of grades must be done in a manner that ensures confidentiality - see [http://www.mcmaster.ca/univsec/fippa/fippa.cfm](http://www.mcmaster.ca/univsec/fippa/fippa.cfm)

#### ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES POLICY

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) [https://sas.mcmaster.ca/](https://sas.mcmaster.ca/) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s [https://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf](https://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf)

#### ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDEGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.
REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK – MSAF (ASSIGNMENTS, MID-TERMS, ETC)

The McMaster Student Absence Form is a self-reporting tool for Undergraduate Students to report absences that last up to 5 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately regarding the nature of the accommodation.

If you are absent more than 5 days or exceed 1 request per term you MUST visit your Associate Dean’s Office (Faculty Office). You may be required to provide supporting documentation.

This form should be filled out immediately when you are about to return to class after your absence.  http://www.mcmaster.ca/msaf/

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.  https://www.mcmaster.ca/policy/General/HR/Discrimination_and_Harassment.pdf

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

8. McMaster Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Equivalent Grade Point</th>
<th>Equivalent Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>12</td>
<td>90-100</td>
</tr>
<tr>
<td>A</td>
<td>11</td>
<td>85-89</td>
</tr>
<tr>
<td>A-</td>
<td>10</td>
<td>80-84</td>
</tr>
<tr>
<td>B+</td>
<td>9</td>
<td>77-79</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>73-76</td>
</tr>
<tr>
<td>B-</td>
<td>7</td>
<td>70-72</td>
</tr>
<tr>
<td>C+</td>
<td>6</td>
<td>67-69</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>63-66</td>
</tr>
<tr>
<td>C-</td>
<td>4</td>
<td>60-62</td>
</tr>
<tr>
<td>D+</td>
<td>3</td>
<td>57-59</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>53-56</td>
</tr>
<tr>
<td>D-</td>
<td>1</td>
<td>50-52</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0-49</td>
</tr>
</tbody>
</table>