

# Building Services Engineering (BSE) – ENVE 4107

Fall 2021, Lectures: Wednesdays, 8:35-11:35

Tutorials and Labs: Even weeks, Mondays: 14:35-17:25

Instructor: Prof. Liam O'Brien, Ph.D., P.Eng., email: [Liam.O'Brien@carleton.ca](mailto:Liam.O'Brien@carleton.ca),

Prof. O'Brien office hours: by appointment only and at least 24 hours before assignments are due

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## Course description

This course provides students with working knowledge on how building mechanical, electrical, and plumbing (MEP) systems are designed and operated. Major buildings systems covered by the course include: heating, ventilating, and air-conditioning (HVAC) equipment, lighting and electrical systems, and water/wastewater. Standard and advanced operational strategies and the systems that support them are also covered. By the end of the course, students should have good knowledge of building system components and integration, quantitative design methods, and operational strategies. Guest lectures and technical tours will be used to supplement the regular lectures. Lab/tutorial activities include technical tours, field studies, software use, and/or example problem solving.

## Learning objectives

After taking the course, students should be able to:

- Be able to identify and describe the functionality all major building service systems, their components, and the role they serve in buildings
- Perform calculations and modeling to support preliminary design of building HVAC, electrical, and water systems
- Understand and quantify the broad impacts of building service systems on the building, occupants, and the environment

## Online approach

All lectures and tutorials will occur or be released as scheduled. They will generally be live, but some may be recorded in advance and release at or before the regularly scheduled time. Lectures and tutorials will be recorded (guest lectures may not be). However, students are strongly encouraged to attend live.

## Evaluation

Assignments (4 total, spaced at about 3-week intervals)	40% (10% each)
Mid-term exam – covers material up to the exam date	20%
Final Exam - Covers entire term; exam will be scheduled during the exam period.	40%

**Students must receive at least 50% on the final exam to pass the course.**

*All evaluation (assignments, exams) will be in SI units. However, it would be beneficial for students to be comfortable with basic conversions to IP units (e.g., CFM).*

## Course Materials

Course/exam material consists of freely available: textbook chapters, PowerPoint presentations, conference and journal papers, government reports, and building standards. Refer to course schedule for details. The concepts discussed by guest lecturers may also be covered in evaluations.

## Assignments

Four assignments will be given throughout the term. Assignments will be posted a minimum of two weeks before they are due. Refer to course schedule (which will be updated regularly) on BrightSpace for deadlines. Assignments are due in class at the beginning of the lecture or will be considered late. Refer to assignment sheet for submission instructions. Late assignments will be accepted but with a 20% per day mark reduction. Assignments are to be completed individually; evidence of direct copying will be treated as cheating and will be handled accordingly (i.e., reported to the Dean's office).

## Exam

Exams will be open-book and will cover all material taught from the beginning of the course up to the date of the exam.

## Student accommodation

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website ([www.carleton.ca/pmc](http://www.carleton.ca/pmc)) for the deadline to request accommodations for the formally-scheduled exam (if applicable).