Western University
Department of Mechanical & Materials Engineering

MME 4483a – "Heating, Ventilating and Air Conditioning I"

COURSE OUTLINE – 2025-2026

CALENDAR DESCRIPTION: The psychrometry of air conditioning processes, comfort and inside design conditions, climate and outside design conditions, heat gains from solar and other sources, cooling load and heating load calculations, ventilation and filtration.

PREREQUISITES: MME 3334A/B
Unless you have either the requisite for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

ACCREDITATION UNITS: Engineering Science = 75%, Engineering Design = 25%

TOPICS:

1. Introduction to HVAC
2. Typical Air Conditioning Systems
3. Psychrometry
3. Heat Transfer and heat transmission in Building Structures
4. Comfort and Air Quality
5. Space Heating Load
6. Cooling Load

LEARNING OUTCOMES: The Mechanical and Materials Engineering Program has been accredited by Canadian Engineering Accreditation Board (CEAB) of Engineers Canada. Accredited programs provide the academic requirements for licensure as a professional engineer in Canada. Western Engineering has defined indicators of the 12 Graduate Attributes (GAs) that the CEAB expects graduating engineering students to demonstrate. The connections between course learning outcomes and Western Engineering's GA Indicators are identified below.

Upon successful completion of this course, students will be able to:

1. Classify and diagram various air conditioning systems. (D2)
2. Sketch and analyse the psychrometric process (I2, PA2)
3. Calculate the heat transfer coefficients of building structure and analyse the thermal performance (I2, KB3)
4. Calculate the ventilation requirement of various building applications (KB4, PA2)
5. Calculate the heating and cooling load of buildings (**ITW2**, I2)
6. Use commercial software to perform the heating and cooling load calculations (ET2)
7. Design basic HVAC system to satisfy load conditions (**D2**)

CONTACT HOURS: 3 lecture hours, 2 tutorial hours, one 3-hourse lab exercise; half course

TEXTBOOK: McQuiston, F.C. and Parker, J.D., *Heating, Ventilating and Air Conditioning (Analysis and Design)*. Wiley, 7th Edition.

Heating, Ventilating, and Air Conditioning: Analysis and Design, 7th Edition | Wiley

Note: Older version of the textbook such as 6th or 5th editions are acceptable.

https://bookstore.uwo.ca/

REFERENCES: ASHRAE Handbook – Fundamentals; Trane Manual

COURSE WEBSITE: https://westernu.brightspace.com/d2l/login

UNITS: British Engineering Units will be used primarily, with some examples using SI Units

COMPUTING: Hourly Analysis Program (HAP) from Carrier Co.

EXAMINATIONS AND QUIZZES:

Assessment Type	Material Covered	Tentative Due Date	Weight
Homework Assignments (two)	Topic 2,3	Thursday Oct. 9 and Oct 23	5%
ASHRAE, Virtual tour and quiz		Tour: Monday Sep 29 Quiz: Monday Oct 13 ASHRAE: TBD	5%
Lab	Topic 2	Week of Oct 13	5%
Mid-term Exam (Open book)	1, 2, 3, 4	Thursday November 13th	25%
Group HVAC Load calculations project		Thursday, December 4th	25%
Final Exam (Open book)	Topics 2, 3, 4, 5, 6	TBD	35%

If a minimum of 50% is not obtained on the final examination, the student will be assigned a grade of no greater than 48% for the course.

ENGLISH: In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests and examinations for improper use of English. Additionally, poorly written work, with the exception of final examinations, may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

INSTRUCTOR:

M. Walid Altahan
Room - SEB 1067
e-mail : waltahan@uwo.ca
519-661-2111 Ext: 88293

Office Hours : Mondays 12:30 to 1:30

ATTENDANCE: Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

COURSE POLICIES: The following course-specific policies will be enforced throughout the course:

Laboratory sessions

- Students are required to attend one lab session only during the term.
- A maximum of **one** make-up session will be offered to students who have missed a laboratory session **with** academic consideration.
- Missing of a laboratory session **without** academic consideration will translate into a zero mark for that laboratory session.
- Students arriving to a laboratory session later than 30 minutes after the scheduled start time will be considered absent and will receive a zero mark for that laboratory session.
- Complete hard copy of lab report is due at the end of the lab session.
- Lab reports will not be accepted if the student did not attend the laboratory experiment.

Team deliverables

- While the default assumption is that everyone contributes equally to the team effort (*i.e.,* project and labs) and hence everyone should receive the same mark for the team submission, individual adjustments of the marks are also permitted, and they are left at latitude of the instructional team (*i.e.*, course instructor and teaching assistants).

Midterm and Final examination

- Exams are open-book.
- The midterm is a mandatory assessment for this course; therefore, academic consideration will not be granted for absence requests without appropriate documentation.
- A student who misses the midterm **without** academic consideration will receive a zero mark for the midterm.
- A student who misses the midterm **with** academic consideration will complete a make-up midterm as soon as possible (typically within the same week as the midterm). If this is not possible, the value of the midterm will be shifted to the final exam, at the instructor's discretion and after discussion with the student.

NOTE:

The above topics and outline are subject to adjustments and changes as needed.

General Faculty / University Policies

The Faculty of Engineering and Western University have overarching policies that prescribe how undergraduate courses should run. The course-specific policies described above should be considered *in addition to* those overarching policies, or as course-specific interpretations of them. In the event of contradictions or confusion between course-specific policies above and general Faculty / University policies, please contact your course instructor for clarification.

Western Engineering's undergraduate polices can be found by navigating to:
https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/policies.html

and then clicking the "*Engineering Undergraduate Policies framework*" link.