



Heating, Ventilation and Air Conditioning of Buildings

ENPM 625
Spring 2023

Course Overview

This course focuses on developing fundamentals necessary for HVAC analysis and design, and should be useful for students interested in design and project management, including mechanical, environmental and facilities engineers. The appropriate thermodynamic, heat transfer and fluid mechanics principles are applied to problems encountered in this field. Quantitative analyses (i.e., numerical problems) are stressed through homework and examination.

Learning Outcomes

After successfully completing this course you will be able to:

- Analyze psychrometric processes
- Estimate cooling and heating loads of buildings
- Select appropriate pumps and fans
- Design piping and duct systems
- Size appropriate HVAC equipment
- Use a software to conduct building energy analyses

Course Outline

- HVAC System Design
- Moist Air Properties
- Heat Transmission
- Heating Load
- Solar Radiation
- Cooling Load
- Pumps
- Fans
- Duct Design
- Direct Contact Heat and Mass Transfer
- Heat Exchangers
- Refrigeration

Course Evaluation

Mid-Term Exam	40%
Final Exam	40%
Semester Project	20%

Homework will be assigned but will not be collected or graded.

Dr. Karim Amrane

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or

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Class Meets

Thursday

07:00PM - 9:40PM

Location : JMP 2217

Office Hours

Mondays and Thursdays

9:30AM – 11:30AM

Course Communication

Students are welcome to contact me via email or phone anytime during business hours.

Prerequisite

Undergraduate thermodynamics, fluid mechanics and heat transfer.

Required Resources

Textbook:

McQuiston, F. C., Parker, J. D., and Spitler, J. D., *Heating, Ventilating, and Air Conditioning: Analysis and Design* ; 6th Edition, John Wiley & Sons. ISBN 978-1-119-62879-8

Course website:

All registered students will have access to the course website. Please visit <https://myelms.umd.edu/login> for instructions on how to obtain a login/password.

Software:

The semester project will require the use of computer software capable of modeling a wide range of commercial buildings. Students have the choice to use either eQUEST or EnergyPlus for their project. These software models can be downloaded for free from the internet.

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses. Please visit <https://academiccatalog.umd.edu/graduate/policies/academic-record/> for the Office of Graduate Studies' list of campus-wide policies.

Accessibility and Reasonable Accommodations

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The University of Maryland provides reasonable accommodations to qualified individuals. Reasonable accommodations shall be made in a timely manner and on an individualized and flexible basis.

Discrimination against individuals on the grounds of disability is prohibited. The University also strictly prohibits retaliation against persons arising in connection with the assertion of rights under this Policy.

Accessibility & Disability Service (ADS) facilitates reasonable accommodations to qualified individuals. For assistance in obtaining an accommodation, contact Accessibility and Disability Service at [301.314.7682](tel:301.314.7682), or adsfrontdesk@umd.edu. More information is available from the [Counseling Center](#).

Get Some Help!

You are expected to take personal responsibility for your own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting <http://ter.ps/learn> and schedule an appointment with an academic coach. Sharpen your communication skills (and improve your grade) by visiting <http://ter.ps/writing> and schedule an appointment with the campus Writing Center. Finally, if you just need someone to talk to, visit <http://www.counseling.umd.edu>.



Everything is free because you have already paid for it, and **everyone needs help**... all you have to do is ask for it.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.