## MECH 410: Heating, Ventilating and Air-Conditioning (3 credits)

This course will build on concepts learned in Heating, Ventilating and Air-Conditioning (HVAC). Students will learn a wide range of topics including Air conditioning systems, Properties of moist air, Moist air processes, Space air conditioning, Indoor air quality--comfort and health, Heat transfer from human body, Heat transfer in building envelopes, Infiltration heat load and weatherizing, Computation of the heating load, Heat gain by solar radiation, Computation of the cooling load, Energy requirements for HVAC systems; building energy audit, Fans--performance, selection, and installation, Air flow in ducts and fittings, Design of duct systems, Codes & standards for building energy systems, Annual energy consumption.

(Prerequisite: MECH 351 and MECH 452)

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1. Demonstrate critical knowledge and understanding of Heating, Ventilating and Air-Conditioning equipment and system components, their functions, and their relationship within a system.

A2. Effectively apply a diverse range of mathematical concepts specifically tailored to the domain of Heating, Ventilation, Air Conditioning (HVAC), showcasing a comprehensive understanding of mathematical principles and their practical applications within the context of HVAC systems and processes.

B1. Determine and modify the design heating and cooling loads and the energy consumption of buildings to meet comfort and energy savings targets.

B2. Use a psychrometric chart to estimate heating, cooling, humidifying and dehumidifying requirements for air conditioning components and systems.

B3. Communicate HVAC ideas coherently and effectively, in written and oral form.

C1. Function effectively on a team to deliver a predefined design project related to HVAC.

**Course Learning Resources:**

* Heating, Ventilating, and Air Conditioning: Analysis and Design, 7th Edition. Authors:  Faye C. McQuiston et al.
* Principle of Heating, Ventilating, and Air Conditioning in Building 1st Edition. Authors: John W. Mitchell and James E. Braun
* Principle of Heating, Ventilating, and Air Conditioning in Building 9th Edition. Authors: Kevin L. Amende, Julia Keen, Lynn E. Catlin, Megan Tosh, Andrew M. Sneed, Ronald H. Howell

**Course Content:**

1. Introduction to HVAC systems
2. Fundamental and scope of HVAC
3. Classification of Air-Conditioning System
4. System International units
5. Moisture Air properties
6. Moist Air and The Standard Atmosphere
7. Fundamental Parameters
8. The Psychrometry of Air Conditioning Processes.
9. Psychrometry Chart.