ME 422 HVAC&R SYSTEM DESIGN

Instructor : Dr. Özgür BAYER A-123 email:bayer@metu.edu.tr
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Schedule :
Tuesday 14:40 - 15:30 B-101
Wednesday 11:40 - 13:30 B-101

References :
8. TS 825 Thermal Insulation in Buildings.
9. TMMOB Makina Mühendisleri Odası Yayın No. 84 Kalorifer Tesisatı Proje Hazırlama Teknik Esasları.

Grading :
2 Midterm Examinations, Homeworks & Projects : ~ 65 %
Final Examination : ~ 35 %

Course Contents :
1. Design of Warm Water Heating System (A brief review)
2. Summer Air Conditioning System Design
   - Cooling Load Calculation
   - Psychrometric Analysis and System Arrangement
3. **Analysis and Design of Year-round A.C. Unit**

4. **Duct and Air Distribution System Design**

5. **Air Cleaning and Filtering**

6. **Vapor Compression Refrigeration**
   - Thermodynamic Analysis of Vapor Compression Refrigeration Cycles
   - Thermal Design of Compressors, Evaporators, Condensers and Expansion Devices

7. **Heat Pumps**

**Catalog Description:**
Psychrometric analysis of summer air conditioning systems. Air cleaning and filtering. Analysis and design of a year-round air conditioning unit. Ducting and air distribution. Vapor compression refrigeration equipment in HVAC&R systems. Thermal design of condensers and evaporators, refrigeration compressors, expansion devices, control equipment and systems in HVAC&R applications. Design projects on HVAC&R systems.

**Course Objectives:**
- To establish the link between the basic thermal-fluid sciences and the systems used in HVAC&R.
- To study the design procedures in accordance to ASHRAE, IHVE and Turkish standards in HVAC&R practice.
- To discuss the design alternatives in terms of design objectives, feasibility, cost effectiveness and other relevant factors.
- To develop the work experience and skills of students in project groups for the design of HVAC&R systems.

**Relationship with other undergraduate and graduate courses:**
As a continuation of ME 403, this course strengthens the link between the basic and applied thermal sciences in a design methodology.