



PRGR 641- HVAC Systems for Energy Efficient Acclimatization

Catalog description: (2 credits)

Energy conservation measures in the built in environment to enhance the building's energy efficiency while maintaining space thermal comfort and indoor air quality requirement. Overall and segmental thermal comfort models with localized air quality. Fundamental ventilation, indoor-air-quality, infiltration natural and mechanical ventilation, importance and impact of indoor air quality on human health and energy performance of the building air conditioning system. ASHRAE requirements for ventilation. Personalized ventilation and personalized cooling devises.

Textbook: Lectures

References: ASHRAE Hand Book, the library, and the web.

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Educational Objectives/Learning Outcomes:

On successful completion of the course, students will be able to:

- 1- Develop the ability to design/select appropriate HVAC control systems for acceptable comfort and IAQ
- 2- Design HVAC systems to minimize energy consumption based on a control strategy.
- 3- Control, strategies and equipment used to reduce the amount of energy consumed by heating, ventilating, and air conditioning (HVAC) systems.

Topics covered:

- Review of thermodynamics
- Moist air properties and conditioning processes
- Indoor and outdoor design conditions
- Heat transfer in building components
- Ventilation and infiltration, Solar radiation, heating load calculation, fans and building air distribution



- Heating and Cooling load calculations in Residential and non-residential applications
- HVAC systems control strategies: scheduled start-stop, day-night setback, optimum start-stop, dead band control, duty cycling, demand limiting and load shedding, economizer, and scheduled temperature reset.

Assessment and grades:

Assignments:	48% (8 assignments 6 % each)
Midterm:	15%
Final Exam:	22%
Project:	15%

Delivery Format and Rationale:

This is an online course and will use Moodle as the Learning Management System (LMS). Online Learning aims at bringing new and powerful dimensions to the learning experience.

- Logistics flexibility: location & time are no longer a limitation on learning. Whether all together in a classroom or scattered over many countries, students can still tap into the same course materials.
- Courses are delivered more efficiently, providing opportunities to teach students in more flexible ways.
- Reaching optimum learning with increasingly fewer resources.
- Immediate Results and Feedback: Most online learning technologies integrate online quizzes and other tools to more rapidly evaluate the pace of learning.

Technical support:

This course is uses a Learning Management system called Moodle. Your student account will allow you access to the course, by logging into:

<http://moodle.progreendiploma.com/>

Technical assistance for online courses is available Monday-Friday from 8 a.m. until 5:00 p.m. (UTC+02:00) through:

- Sending an e-mail to: moodle@aub.edu.lb
- Calling: 00961-1-350000, extension 3515/3518/3599/3586

Computer usage: MS Office, HVAC related software.