

MECH4340 Air Conditioning Systems

Course Code: MECH4340	Course Title: Air Conditioning Systems
Required Course Or Elective Course: elective	Terms Offered (Credits): Spring (3 credits)
Faculty In Charge: Tianshou Zhao	Pre/Co-Requisites:
Course Structure: Lecture: 2 days per week, 1.5 hours; Tutorial: 1 day per week, 1 hour	
Textbook/Required Material: Heating, Ventilating, and Air Conditioning-Analysis and Design	
Bulletin Course Description: <ol style="list-style-type: none"> 1. Understand the principles of various types of HVAC systems based on the fundamentals of Thermodynamics, Fluid Mechanics and Heat Transfer; 2. Develop the students' creativity and capability in the design of HVAC systems. 	
Course Topics: <ol style="list-style-type: none"> 1. General introduction to HVAC. 2. Central Air-conditioning systems: Central mechanical equipment; the air-conditioning and distribution system; all-air systems; air-and-water systems; all-water systems. Unitary Air Conditioners. Heat Pump Systems 3. Refrigeration systems: Vapor-compression system and Absorption refrigeration system. 4. Moist air properties: Moist air and the standard atmosphere, Psychometrics, Space air conditioning-Design conditions and Off-design conditions. 5. Heat transmission in building structures: Basic heat transfer mode, Tabulated overall heat transfer coefficients, Moisture transmission. 6. Solar radiation: Thermal radiation; the Earth's motion about the sun; solar heat gain in building structures. 7. Heating and cooling load calculation 8. CadLink – A commercial Building Services Software 9. Fluid flow, pumps, and piping design 10. Fans and building Air distribution system design 11. Special topics: 12. Thermal storage air-conditioning systems 13. Seawater cooling systems 14. Hong Kong government regulations on Air-conditioning system design and installation. 15. Plant visit 	
Course Objectives:	<ol style="list-style-type: none"> 1. Understand the principles of various types of HVAC systems. 2. Conduct energy analysis to various types of HVAC systems based on the fundamentals of Thermodynamics, Fluid Mechanics and Heat Transfer. 3. Develop the students' creativity and capability in the design of energy conversion system.
Course Outcomes:	<ol style="list-style-type: none"> A. Understand the principles of various types of HVAC systems. B. Be able to analyze various types of HVAC systems. C. Design and size major components of air conditioning systems. D. Rationalize and interpret the design and analysis results.

Assessment Tools:	Homework	5%
	In classroom problem	10%
	Midterm	35%
	Project	10%
	Final examination	40%