

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



COURSE OUTLINE

ACHP 323 - HVAC EQUIPMENT SELECTION

Prepared By: Michael J. Newtown, P.E.
Updated By: Lin Tian, Ph.D. (April 2012)
Updated By: Michael J. Newtown, P.E. (Nov. 2015)

**CANINO SCHOOL OF ENGINEERING TECHNOLOGY
MECHANICAL & ENERGY TECHNOLOGIES DEPARTMENT
November 2015**

ACHP 323 - HVAC EQUIPMENT SELECTION

- A. TITLE: HVAC Equipment Selection
- B. COURSE NUMBER: ACHP 323
- C. CREDIT HOURS: 3
- D. WRITING INTENSIVE COURSE: (OPTIONAL): NA
- E. COURSE LENGTH: 15 weeks
- F. SEMESTER(S) OFFERED: Fall, Spring, or Summer
- G. HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY: 3 – 1 hour lectures per week
- H. CATALOG DESCRIPTION:
- This course includes the selection and layout of modern HVAC equipment for commercial buildings. Special concern is applied to ASHRAE Standards, codes and cost analysis.
- I. PRE-REQUISITES/CO-COURSES: Pre-requisite course ACHP 254, Domestic and Commercial Heating II
- J. STUDENT LEARNING OUTCOMES: Student will be able to:

<u>Course Objective</u>	<u>Institutional SLO</u>
a. Review architectural drawings and determine the mechanical system that will provide comfort to occupants	2. Crit. Thinking 3. Prof. Competence
b. Reference manufacturer catalogs and select the correct size appliance to provide comfort to occupants	2. Crit. Thinking 3. Prof. Competence
c. Evaluate the building code and applicable standards to ensure equipment selected is in compliance	2. Crit. Thinking 3. Prof. Competence
d. Correctly size systems based on the building design and occupant usage	2. Crit. Thinking 3. Prof. Competence
e Appraise the equipment cost and energy consumption due to system selection	2. Crit. Thinking 3. Prof. Competence

- K. TEXTS:
- Haines, Roger W. and Wilson, C. Lewis, HVAC System Design Handbook, 4th Edition, McGraw-Hill, 2003

L. REFERENCES:

Current edition of HVAC System and Equipment Handbook, ASHRAE

ANSI/ASHRAE Standard 62.1 2007 Ventilation for Acceptable Indoor Air Quality, ASHRAE, 2007

Pita, Edward, Air Conditioning Principles and Systems, 7th edition, Prentice Hall 2007

M. EQUIPMENT: Technically enhanced classroom

N. GRADING METHOD (P/F, A-F, etc.): A -F

O. MEASUREMENT CRITERIA: Exams, Homework, quizzes, and projects

P. DETAILED TOPICAL OUTLINE:

- I. Review of criteria for equipment selection
 - A. Criteria for system and equipment selection
 - B. Options available to designers
 - C. Psychrometric charts
 - D. Altitude and temperature effects
- II. Air Handling Systems
 - A. Fans and Flow rates
 - B. Duct Design
 - C. Distribution devices and filters
 - D. Noise control
 - E. Indoor air quality ASHRAE Standard 62.1
 - F. Energy standards assessment
- III. Selection of fluid handling systems
 - A. Steam
 - B. Water
 - C. Hydronics
 - D. Secondary fluids (brines and Glycols)
 - E. Piping systems
 - F. Pumps
 - G. Energy standards assessment
- IV. Selection of central plants
 - A. General plant design concepts
 - B. Central Steam plant
 - C. Central Hot-water plants

- D. High-temperature hot water plants
- E. Fuels and energy efficiency
- F. Chilled water plants
- G. Thermal storage systems
- H. Heat recovery design
- I. Distribution systems of central plants
- J. Co-generation systems
- K. Energy standards assessment
- V. Cooling Equipment
 - A. Refrigeration cycle review
 - B. Refrigeration equipment review
 - C. Selection of condenser and compressor
 - D. Evaporator selection
 - E. Review of past refrigerant
 - F. Modern refrigerants and capacities
 - G. Codes and standards for cooling equipment
 - H. Equipment cost and energy consumption appraisal
- VI. Heating Equipment
 - A. Boiler types and applications
 - B. Combustion processes and fuels
 - C. Codes and standards for heating equipment
 - D. Direct and indirect fired heating equipment
 - E. Heat exchanger selections
 - F. Terminal heating equipment
 - G. Solar heating
 - H. Humidification
 - I. Equipment cost and energy consumption appraisal
- VII. Air handling Units
 - A. AHU system specification and selection
 - B. Manufacture packaged systems vs. custom systems
 - C. Outside air quality and indoor air quality
 - D. Exhaust systems
 - E. Smoke control
 - F. Equipment cost and energy consumption appraisal
- VIII. Design documentation
 - A. Codes and standards for HVAC systems
 - B. Writing construction specifications
 - C. Drawing and documentation phases
 - D. Participation during construction
 - E. Commissioning
 - F. System cost and energy consumption appraisal