STATE UNIVERSITY OF NEW YORK

COLLEGE OF TECHNOLOGY

CANTON, NEW YORK

COURSE OUTLINE

ACHP 243 – AIR CONDITIONING I

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CANINO SCHOOL OF ENGINEERING TECHNOLOGY
MECHANICAL & ENERGY TECHNOLOGY
MAY 2015

A. TITLE: Air Conditioning I

B. COURSE NUMBER: ACHP 243

C. CREDIT HOURS: 3

D. WRITING INTENSIVE COURSE (OPTIONAL): No

E. COURSE LENGTH: 15 weeks

F. SEMESTER(S) OFFERED: Fall

G. HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:
2 hours lecture and 3 hours laboratory

H. CATALOGUE DESCRIPTION:

The properties of air and water vapor mixtures are determined by calculation and by the use of psychometric charts. Air conditioning processes are studied leading to selection of systems. Cooling and refrigeration loads are calculated for commercial and residential structures. The performance of air conditioning systems and the use of instruments is covered in the laboratory.

I. PRE-REQUISITES/CO-COURSES: MECH 103 – Introduction to HVAC-R

J. GOALS (STUDENT LEARNING OUTCOMES):

By the end of this course, the student will:

Course Objective	*Institutional SLO*
a. Analyze refrigeration system & determine operating condition	2. Crit. Thinking 3. Prof. Competence
c. Analyze the air conditioning process on a psychometric chart	2. Crit. Thinking 3. Prof. Competence
d. Select components for refrigeration systems	2. Crit. Thinking 3. Prof. Competence
e. Evaluate air conditioning system components	2. Crit. Thinking 3. Prof. Competence

K. TEXTS: Air Conditioning Principles and Systems by Edward G. Pita, Publisher – Wiley, Fourth Edition, 2002

L. REFERENCES: ASHRAE Fundamentals Handbook, 2005

M. EQUIPMENT: None

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

O. MEASUREMENT CRITERIA/METHODS: Hourly exams, quizzes, homework, and comprehensive exam.

P. DETAILED TOPICAL OUTLINE:

I. Scope and Uses of Air Conditioning
   A. Conditions controlled by air conditioning systems
   B. Components of an air conditioning system
      1. Hydronic systems
      2. All-air systems
   C. Human Comfort
      1. Factors affecting comfort
      2. Effective temperature
   D. Consideration in designing, installing, operating, and maintaining air conditioning systems.

II. The Refrigeration Cycle
   A. Load calculations
   B. System selection
      1. Evaporators
      2. Condensers
      3. Compressors
      4. Refrigeration piping and accessories
   C. Systems equilibrium & cycling controls

III. Psychrometrics
   A. Properties of air
   B. Energy and moisture content of air
   C. Use of psychrometrics charts

IV. Cooling Load Calculations
   A. Heat Storage Effect- Instantaneous vs. space cooling load
   B. Room Heat Gain
      1. Conduction through exterior structure
      2. Conduction through interior structure
      3. Solar radiation through glass
      4. Design conditions
      5. Lighting
      6. People
      7. Equipment
      8. Infiltration
      9. Heat transfer to surroundings

V. Air Conditioning Systems and Equipment
   A. Systems Classification by Cooling/Heating Fluid Distribution
      1. All-air systems
      2. All-water systems
      3. Air-water combination systems
   B. All-Air Systems
      1. Single zone system
      2. Reheat system
      3. Multizone system

Q. LABORATORY OUTLINE:

1. Refrigeration cycle lab and operation of gage set
2. Performance of condenser with varying water flow rate
3. Performance of evaporator with varying water flow rate
4. Performance of compressor with varying speed
5. Refrigeration controls low pressure cut-out
6. Refrigeration controls thermostatic and automatic expansion valve
7. Water cooled condenser performance
8. Familiarization with psychrometrics chamber
9. Fan and by pass coil performance
10. DX coil performance
11. Adiabatic wash performance
12. Design application for coils
13. Computer modeling