



## MASTER COURSE OUTLINE

Prepared By: Bill Autry

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### COURSE TITLE

Introduction to Refrigeration & Air Conditioning

### GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 130

(Formerly: )

CIP Code: 47.0303

Intent Code: 21

Program Code: 768

Credits: 5

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 33

Lab Hrs: 44

Other Hrs:

Distribution Designation:

### COURSE DESCRIPTION (as it will appear in the catalog)

Fundamental physical, chemical, engineering, and mechanical aspects of the refrigeration process.

### PREREQUISITES

IST 100, IST 102, IST 106, and MAP 103/MAP 117, or Instructor Permission

### TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty (Example: *Modern Refrigeration & Air Conditioning*, by Althouse, Turnquist, and Bracciano)

### COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.*

1. Demonstrate a working knowledge of refrigeration processes
2. Demonstrate knowledge of thermodynamic principles
3. Diagnose & troubleshoot simple refrigeration or air conditioning problems

### INSTITUTIONAL OUTCOMES

### COURSE CONTENT OUTLINE

- 1) Physical Properties
  - a) Heat & heat flow
  - b) Temperature measurement
  - c) BTU's
  - d) Temperature/pressure relationship
  - e) States of Matter
  - f) Latent Heat
  - g) Humidity
  - h) Enthalpy
- 2) Refrigeration Tools

- a) Working with tubing
  - b) Pipe fittings
  - c) Flares
  - d) Service valves
  - e) Gauge manifold
  - f) Evacuation
- 3) Basic Refrigeration Systems
- a) Evaporative refrigeration
  - b) Flooded systems
  - c) Expansion valves
  - d) Multiple evaporators
  - e) Compound systems
  - f) Cascade systems
  - g) Absorption systems
  - h) Defrost systems
- 4) Compression Systems and Components
- a) Compression cycle
  - b) Evaporators
  - c) Accumulators
  - d) Filter dryers
  - e) Oil separation
  - f) Condensers and receivers
  - g) Compressor types
- 5) Refrigerant Controls
- a) Automatic expansion valves
  - b) Thermostatic expansion valves
  - c) Flash gas
  - d) Super heating
  - e) Floats
  - f) Solenoids
  - g) EPR's
- 6) Refrigerants
- a) Refrigerant identification
  - b) Expendable refrigerants
  - c) Cryogenic fluids
  - d) Freon family
  - e) Ammonia
  - f) Refrigerant oils
  - d) Recovery
- 7) Heat Loads & Piping
- a) Computing heat loads
  - b) Capacities of Evaporators, condensers, and related equipment
  - c) Effective latent heat
  - d) Saturated vapor & superheat
  - e) Engineering system capacities
- 8) Absorption Systems

- a) Principles and applications
  - b) Residential air conditioning
  - c) Commercial type
  - d) Servicing Lithium Bromide systems
- 9) Fundamentals of Air Conditioning
- a) Air and its properties
  - b) Humidity
  - c) Air handling
  - d) Psychometric charts
  - e) Heat pumps

**DEPARTMENTAL GUIDELINES** *(optional)*

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**DIVISION CHAIR APPROVAL**

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**DATE**