San Bernardino Valley College
Curriculum Approved: February 4, 2002

I. CATALOG DESCRIPTION:

A. Department Information:

Division:	Refrigeration and Air Conditioning
Department:	Refrigeration and Air Conditioning
Course ID:	REFRIG 056A-Z
Course Title:	Refrigeration Heating II
Units:	3
Lecture:	3 Hours
Prerequisite:	None

B. Course and Schedule Description: This is the second term of a three-term national training course offered in conjunction with the Refrigeration Service Engineers Society and is a comprehensive study of heat sources and distribution. This course is designed to help certify journeymen-level refrigeration technicians and keep their knowledge current. Department Advisory: HVAC Refrigeration work experience

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of this course, students will be able to:

A. Examine the characteristics of oil burners, gas burners, and electric heat
B. Inspect different control systems; warm air, fan, and hydronic
C. Distinguish between different furnaces and their operation
D. Design an air distribution system to include layout and duct sizing.
E. Recognize boilers; their installation and piping
F. Review safety practices
G. Consider different customer relation methods.

IV. CONTENT:

A. Review of Fundamentals
   1. Heat load calculations
B. Oil Burners
   1. Fuel characteristics
   2. Capacity selection
   3. Tanks and piping
   4. Controls, start-up
C. Gas Burners
   1. Fuel gases, burner types
   2. Equipment location piping for gas
   3. LP gas installation procedures
   4. Electrical controls
D. Electric Heat
   1. Duct heaters and furnaces
   2. Pumps
   3. Baseboard and unit heaters
   4. Radiant heat installation and service
E. Control Systems
   1. Controls - warm air - fan & limit - hydronic
F. Warm Air Furnaces
   1. Types and space heaters
   2. Installation and service procedures
G. Duct Sizing and Layout
   1. Warm air - dampers and diffusers

2. Room air distribution
3. Humidification

H. Boiler Installation (Steam and Hot Water)
1. Start up/maintenance (steam and hot water)

I. Heat Distributing Units, Unit Heaters, Convectors (Steam & Hot Water)

J. Hot Water Specialties
1. Pumps
2. Piping design and sizing
3. Methods of piping
4. System controls

K. Steam Heat Systems
1. Specialties and controls

L. Converters and Instantaneous Heaters

M. Energy Conservation
1. Review of safety and codes

N. Customer Relations

V. METHODS OF INSTRUCTION:

Methods of instruction will vary from instructor to instructor but will include:

A. Lectures and discussions about oil burners, gas burners, electric heat, control systems, furnaces, air distribution systems, boilers and customer relations.

B. Lectures and discussions are complemented with handouts and instruction on different methods of analysis and troubleshooting.

C. Dynamics are accented with the use of charts and videos.

VI. TYPICAL ASSIGNMENTS:

Typical assignments will vary from instructor to instructor but may include:

A. Identify the components in an electric furnace.

B. Outline the maintenance of a steam boiler.

C. Explain the method and sequence of operation of an LP furnace.

VII. EVALUATION:

A. Methods of evaluation will vary from instructor to instructor but may include:
1. Written tests
2. Final exam
Typical Questions:
a. Identify the components in a gas furnace.
b. What happens if the furnace ducting is too large?

B. Frequency of evaluation will vary from instructor to instructor but may include:
1. Three written tests
2. One final exam

VIII. TYPICAL TEXT:

Refrigeration Service Engineers Society, RSES Total Heating, Refrigeration Service Engineers Society, Des Plaines, IL, 2002

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None