

Revised 1/ 2013

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
AIR 238 – ADVANCED TROUBLESHOOTING AND SERVICE (4 CR.)**

Course Description

Covers an in-depth study of troubleshooting and repair of all equipment in the program. Presents advanced service techniques on wide variety of equipment used in refrigeration, air conditioning, and phases of heating and ventilation and controls. Lecture 3 hours. Lab 3 hours. Total 6 hours per week.

General Course Purpose

This course is designed to prepare students for employment in the refrigeration and air conditioning field.

Course Prerequisites/Corequisites

Prerequisite: AIR 251

Course Objectives

Upon completion of this course, the student should be able to:

- Diagnose service problems quickly
- Decide whether to repair or replace a part or equipment
- Maintain, repair, and/or replace compressors
- Analyze air movement and blower problems and make repairs
- Maintain and install commercial refrigeration units and cases
- Maintain and repair ice machines
- Install, repair, and service humidification equipment
- Diagnose and repair low and high voltage control circuits

Major Topics To Be Included

1. Troubleshoot
 - a. Low voltage control circuits
 - b. Compressors, fan and blower motors, start and run caps, and start relays
 - c. Electric forced air heat
 - d. Gas heat 80+ and 90+ furnaces
 - e. Oil heat
 - f. Hydronic heat gas, oil and electric boilers
 - g. Heat pumps
 - h. Walk-in coolers and freezers
 - i. Reach-in coolers and freezers
 - j. Ice machines cubers and flakers
2. Water pumps
 - a. Seals
 - b. Bearings
 - c. Impellers
3. Compressors
 - a. Seals
 - b. Gaskets
 - c. Valve plates
 - d. Oil pumps
4. Blower Motors
 - a. Bearings
 - b. Lubrication
 - c. Mounts

- d. Speeds
- e. Relays
- 5. Air Cleaners
 - a. Service
 - b. Repairs
- 6. Humidifiers
 - a. Types
 - b. Preventive maintenance
 - c. Repair
- 7. Heat and Cool Controls
 - a. Thermostats
 - b. Relays
 - c. Contactors
 - d. Delay timers
 - e. Valves
- 8. Ice Machines
 - a. Makes
 - b. Sequence
 - c. Controls
 - d. Repair or replace
- 9. Water Chillers (up to 200 tons reciprocating compressors)
 - a. Preventive maintenance
 - b. Replacement parts
 - c. Repair
 - d. Alignment
- 10. Residential Air Conditioning Condensing Units
 - a. Maintenance
 - b. Repair
 - c. Controls
 - d. Servicing
 - e. Replacement parts
- 11. Rooftop Units
 - a. Care
 - b. Maintenance
 - c. Repair
 - d. Restrictions
 - e. Installation

Extra Topics (Optional)