

NASSAU BOCES - ADULT EVENING PROGRAM
Joseph M. Barry Career & Technical Education Center
1196 Prospect Ave.
Westbury, NY 11590

COURSE OUTLINE

Course Name: **RAC-II (Refrigeration Air-Conditioning)**
Weeks: 11.5
Sessions: 23
Hours: 70
Days/Time: Tu/Thu 7-10 pm
Instructor: Louis Gaeta
Required Textbook: Heating and Cooling Essentials by Killinger, Publisher: Goodheart-Willcox
Prerequisites: RAC-I
Adult evening Office: (516) 622-6950

Course Overview:

This course builds upon the knowledge and skills a student obtained in RAC-I. In RAC 2 students will study how to troubleshoot, diagnose and repair electrical and mechanical failures found within refrigeration and air conditioning systems. The course provides students with both a theoretical and hands on approach to learning. Students will apply the knowledge they learned in the classroom and will be given the opportunity to diagnose and repair refrigeration and air conditioning systems in the shop. Upon completion of the course, the student should be able to enter into the Air Conditioning and Refrigeration field as a well-rounded first year mechanic.

RAC Certificate Program: Must take RAC-I plus RAC-II, Refrigerant Recovery & Recycling, EPA Seminar & Test for a total of 145 hours.

HVRAC/EPA Certified Technician: Must take RAC-I, RAC-II, Refrigerant Recovery & Recycling, EPA Seminar & Test, Gas Burner, Blueprint Reading, Hydronics, Motor Controls for a total of 288 hours.

Course Topics

Session 1 Course introduction.
Session 2 Review principles covered in RAC1. This will include the basic cycle, and pressure temperature relevancies.
Session 3 Introduction to pressure controls (i.e., high pressure, low pressure, oil pressure and temperature controls).
Session 4 Temperature controls, thermostat (i.e. air conditioning), refrigeration temperature control and use of the low pressure control as a temperature control.
Session 5 Continuation of the low pressure control as a temperature control based on temperature pressure relevancies; Introduction to electrical wiring of the above-referenced controls.
Session 6 Shop Class: Apply principles learned in sessions 3-5 in shop. Students will be required to keep a shop log.
Session 7 Students will be introduced to induction motors, and the principles behind how the induction motors operate.

- Session 8-11 Students will study the six different types of induction motors, their characteristics and application. Students will learn how to troubleshoot and diagnose problems using their meters. Upon completion of this part of the program, students should be able to identify and troubleshoot a large portion of electrical and mechanical problems that occur within the systems.
- Session 12 Shop Class: Students will construct a test cord to diagnose troubles within a refrigeration system i.e. compressor).
- Session 13 Shop Class: Students will apply their test cord in shop by using the test cord in a real world practical application. Students will also be testing their own test cord for problems, to see if the test cord was constructed properly in accordance with the wiring diagram they received.
- Session 14 Introduction to refrigerant gasses application, retro-fitting, applicable refrigeration oils, and the different refrigerants used for different refrigerators.
- Session 15-16 Students will study various types of compressors. In these two sessions, the different types of compressors, the different application of compressors will be discussed. Students will also view video taps and demonstrations.
- Session 17-18 Shop Class: Students will assemble and disassemble various types of compressors. Students will be required to draw diagrams, keep a shop log and hand in a report in connection to these two sessions.
- Session 19 Students will study metering devices; Discussion of the capillary tube to provide the student with a basis of understanding its operation and function; Discussion of thermostatic expansion valve, its operation and application; Discussion of superheat and superheat settings of a function of the thermostatic expansion valve.
- Session 20 Continuation of thermostatic expansion valve. Introduction to charging system, installing and removing gauges.
- Session 21 Shop Class: Students will install gauges, charge the system, and check superheat of thermostatic expansion valve where applicable. Students will superheat the thermostatic expansion valve where applicable. Students will be given hypothetical problems to solve. Students will be required to complete a report in connection with the principles covered in this session.
- Session 22-23 Students will study types of evaporators and condensers (i.e. air cooled, and water cooled condensers), and condenser operation. Also to be discussed will be condenser temperatures and application, in order to achieve knowledge of running head pressures. Students will also study suction pressures and temperatures as related to a specific type of refrigeration.

Time permitting

- Session 24 Students will be introduced to types of water towers.
- Session 25-26 Students will be studying refrigeration as it applies to air conditioning both in commercial and home cooling. This will be accomplished with both primary and secondary cooling (i.e. Chillers). Some portion of these sessions will be allocated to shop time. Students will be required to hand in a report based on the shop portion of the class.
- Session 27-30 Students will study electrical defrost systems, refrigeration defrost timers, and various controls, wiring schematics, and types of defrost as applying to different types of refrigeration systems. This will also encompass a shop class. Students will be required to submit a report. Additionally, the students will be given a final project to complete. At this time, the students should be prepared to diagnose a series of hypothetical problems in a practical application put to them by the instructor. students may work in groups, assigned by the instructor to prepare a final report based on problems given.

Note: The above curriculum and pacing may be modified somewhat by the instructor.