

**PALM BEACH COMMUNITY COLLEGE
COURSE SYLLABUS**

GENERAL INFORMATION

Professors need to verify this information in the College catalog.

Course number: ACR0307

Credit/Contact hours: 120hrs.

Term: 20061

Course title: Electronics and Refrigeration Systems

PROFESSOR'S INFORMATION

Professor name: Kirk Hoosac

Professor office location: ETA131

Professor office hours: 8:00 to 3:00

Professor telephone: 561-868-3195

Professor fax: 561-8683843

Professor e-mail address: hoosack@pbcc.edu

COURSE INFORMATION

**PALM BEACH COMMUNITY COLLEGE
Course Outline**

Course number and course title

ACR 0307 Electronics and Refrigeration Systems

Catalog description

This course provides instruction in solid-state electronics used in heating, air conditioning, and refrigeration systems including basic principles of direct digital controls, solid-state circuits and boards. Hands-on practice is provided with circuits, boards and programmable thermostats. The functions of a building-management system are explained. Also covered is instruction and hands-on practice in

operating mechanical refrigeration service and testing equipment. Instruction and hands-on practice for refrigerant recovery systems is included.

Contact hours

120

Prerequisites

ACR 0706 Introduction to HVAC/R System Installation

Corequisites

None

Textbook(s) and/or bibliography

Jeffus, Larry (2004)

REFRIGERATION AND AIR CONDITIONING, AN INTRODUCTION TO HVAC/R (4TH)

Pearson Education, Inc., Upper Saddle River, New Jersey

ISBN# 0-13-092571-3

Special fees required by student

None

Materials/equipment required by students:

Safety glasses

Course objectives

- 1. Demonstrate a practical knowledge of solid-state electronics as used in heating, air-conditioning, and refrigeration systems. (17.0)**
- 2. Utilize and operate mechanical refrigeration servicing and testing equipment including the effects of superheat and sub-cooling and use of refrigerant recovery in compliance with Environmental Protection Agency rules. (18.0)**
- 3. Test and size electrical generation and distribution components for commercial heating and air-conditioning systems. (25.0)**

Detailed course content

1 DEMONSTRATE A PRACTICAL KNOWLEDGE OF SOLID-STATE ELECTRONICS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

- a.** Explain the basic principles and functions of direct digital control (DDC). (17.01)
- b.** Explain basic solid-state circuits and boards. (17.02)
- c.** Identify, test, and replace circuits and boards. (17.03)
- d.** Identify and explain the functions of a building-management system. (17.04)
- e.** Program a programmable thermostat. (17.05)

2 UTILIZE AND OPERATE MECHANICAL REFRIGERATION SERVICING AND TESTING EQUIPMENT—The student will be able to:

- a.** Identify the effects of superheat and sub-cooling on a system. (18.01)
- b.** Identify and explain the functions of servicing and testing equipment including vacuum pumps, micron gauges, EPA-approved equipment, leak detectors, and charging systems. (18.02)
- c.** Operate a refrigerant recovery system. (18.03)
- d.** Explain the standards for and ways to measure, test, maintain, and evacuate a mechanical heating, air-conditioning, and refrigeration system. (18.04)
- e.** Evacuate the refrigerant system with various vacuum methods. (18.05)
- f.** Demonstrate compliance with Environmental Protection Agency (EPA) rules and regulations and, if possible, take the EPA test. (18.06)
- g.** Charge various air-conditioning and mechanical refrigeration systems by various methods. (18.07)
- h.** Demonstrate the effects of superheat and sub-cooling on a system. (18.08)

3 TEST AND SIZE ELECTRICAL GENERATION AND DISTRIBUTION COMPONENTS FOR COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS—The student will be able to:

- i.** Determine wire sizes and voltage drops. (25.01)
- j.** Draw and identify power-transformer types. (25.02)
- k.** Test, size, and replace protection devices such as fuses and breakers, motor starters, and overloads. (25.03)

Assessment method(s):

Students will be required to demonstrate each skill set listed above to the instructor by testing, demonstration, observation by the instructor, or in any combination as requested by the Department Chair or Instructor. All bench work or processes will be in accordance to current industry standards under the approval of the instruction staff.

Special Requirements:

The student may apply for cooperative education training. The following procedures are required for each student:

- A training plan will need to be approved by the Department Chair and signed by the student, teacher, and employer, which incorporates the above instructional objectives and a list of on-the-job and in-school learning experiences.
- A workstation that reflects equipment, skills and tasks relevant to this machining course.
- The student must receive compensation for work performed.

Strict adherence to all safety guidelines and instructions must be met to continue in program. Failure to meet these safety rules will result in dismissal from the program.

ADDITIONAL COURSE INFORMATION

Assignments

Textbook and modules

Class schedule

8:00 to 3:00 Monday –Friday Classroom and lab

Computer competency component

Each student will, to the satisfaction of the professor, demonstrate a fundamental understanding of basic computer operations through various professor-determined exercises and/or assignments. These exercises/assignments are included in this syllabus.

Equipment and supplies

Books, goggles, Note books ,pen and pencils

"Gordon Rule" requirements (if applicable)

Grading scale and policy

U or S

Professor's expectations

Understanding theory, and lab exercises

Late assignment policy

If it isn't on time works against the grade

Make-up exam policy

Next time they in class

Minimum requirements

Methods of instruction

Lecturing and hands on training

Tests, quizzes, and final examination schedule

Testing once a week

Unique requirements of the course

Hands on training on state of the art equipment

COLLEGE POLICIES

Academic Dishonesty

Academic dishonesty includes the following actions, as well as other similar conduct aimed at making false representation with respect to the student's academic performance:

- (1) Cheating on an exam,
- (2) Collaborating with others on work to be presented, if contrary to the stated rules of the course,
- (3) Submitting, if contrary to the rules of the course, work previously submitted in another course,
- (4) Knowingly and intentionally assisting another student in any of the above actions, including assistance in an arrangement whereby work, classroom performance, examination, or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed,
- (5) Plagiarism.

Please refer to the Palm Beach Community College Student Handbook for further information.

Attendance

Students are expected to attend all courses and course activities for which they are registered. Any class meeting missed, regardless of cause, reduces the opportunity of learning and may adversely affect a student's achievement in the course. Class attendance policies are set by individual professors and/or departments. An accurate record of attendance will be kept for each class. Students are expected to adhere to the policies set by each Professor.

Students, when officially representing the College, such as on a field trip, shall not be counted absent, provided their professors are given prior notification and any missed assignments are subsequently completed to each professor's satisfaction.

Students will be granted excused absences in the case of a substantiated emergency such as a confining illness, a serious accident or the death of an immediate relative. Professors decide on the validity of the excuses and provide opportunities for students to complete any required make-up work. Students are responsible for immediately informing their professors when they must miss class sessions for emergency meetings.

Classroom Etiquette and Student Behavior Guidelines

Students will demonstrate respect for professors and fellow students. Behavior that is disruptive to a positive learning environment reported by the professor will result in a warning on the first instance; the second instance might result in expulsion from the course or campus.

Disability Support Services

Students with disabilities are advised, in compliance with federal and state laws, that accommodations and services are available through the office of Disability Support Services (DSS). It is the student's responsibility to contact Disabled Student Services Advisors at this location and to submit appropriate documentation prior to receiving services.

Disability Support Services

College-Wide Coordinator	Susan Lang	langs@pbcc.edu	868-3375
Belle Glade	John Pierson	piersonj@pbcc.edu	993-1125
Boca Raton	Susan Mills	millss@pbcc.edu	862-4316
Lake Worth	Jelecia Kirk	kirkj@pbcc.edu	868-3046
Palm Beach Gardens	Ken Swain	swaink@pbcc.edu	207-3193

Eating, Drinking and Smoking

Eating and drinking are confined to (specific to campus). Smoking is not permitted in any College building.

Student Responsibility Policy

When a student attends the College, s/he becomes subject to its jurisdiction. Students are expected to conduct themselves in a responsible manner, in all areas of campus life. By enrolling, they pledge to obey the rules and regulations of the College and are responsible for observing all College policies and procedures as published in the student handbook, the College catalog and other College publications. The student will be responsible for preparing for class, participating in class, and completing assignments on time.

PBCC Websites of Interest

Home Page	http://www.pbcc.edu
Advising	http://www.pbcc.edu/advising.xml
Catalog	http://www.pbcc.edu/catalog.xml
Career Center	http://www.pbcc.edu/career.xml
Disability Support Services	http://www.pbcc.edu/disabilities.xml
Distance Learning	http://www.pbcc.edu/dl.xml
Financial Aid	http://www.pbcc.edu/financialaid.xml
Honors	http://www.pbcc.edu/honors.xml
Library Learning Resource Center	http://www.pbcc.edu/library.xml
PantherWeb/Registration	http://www.pbcc.edu/pantherweb.xml
Programs of Study	http://www.pbcc.edu/programs.xml
SLC/VPI	http://www.pbcc.edu/slc.xml
Student Services	http://www.pbcc.edu/studentsservices.xml
Testing Center	http://www.pbcc.edu/testing.xml