RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

ECTC 201 – Refrigeration II

I. Basic Course Information

A. Course Number and Title: ECTC 201 – Refrigeration II

B. New or Modified Course: Modified

C. Date of Proposal: Fall 2016

D. Effective Term: Fall 2017

E. Sponsoring Departments: Business and Public Service Department

F. Semester Credit Hours: 5

G. Weekly Contact Hours: 9 Lecture: 3
Laboratory: 6
Out of class work per week: 6 hours

H. Prerequisite: ECTC 101 - Refrigeration I
Co-requisite: ECTC 207 – Commercial HVAC Controls and Instruments

I. Laboratory Fees: Yes

J. Name and Telephone Number or e-mail Address of Department Chair:
Anne Marie Anderson, AnneMarie.Anderson@raritanval.edu

II. Catalog Description

Prerequisite ECTC 101 - Refrigeration I; Co-requisite: ECTC 207 – Commercial HVAC Controls and Instrumentation. Refrigeration II is an advanced refrigeration course, requiring a basic knowledge of refrigeration systems and components. The student is introduced to operation, maintenance and design procedures for large commercial and industrial refrigeration equipment and associated instrumentation and control systems. Classroom training is enhanced by means of field trips to commercial buildings, when possible, for the purpose of viewing actual equipment at work and receiving additional on-site training through the sponsorship of plant engineering personnel. The course gives emphasis to understanding the operation of commercial equipment in the context of its performance under varying heating/cooling loads. Modulation is explained as a means to achieve higher efficiencies. The concept of the economizer cycle is introduced as an energy conservation technique.

III. Statement of Course Need

A. Technicians in the Environmental Control Technology field are vital to maintaining physical comfort within our residences. Understanding the structure, components and troubleshooting of commercial refrigeration systems are integral elements for the education of well-trained technicians in the Environmental Control Technology field.

B. Extensive theory and hands-on work in the form of laboratory activities is necessary to familiarize students with system operation, service procedures and best-practice standards followed by professionals in the field and expected of candidates that want to enter this field of work. Lab activities include, but are not limited to: tool/tester/instrument familiarization and proper use techniques; system component identification, assembly/disassembly, troubleshooting and repair procedures.

C. This course generally transfers as a free elective, but it also serves as a Program Elective to Pennsylvania College of Technology for those students graduating with the AAS in Environmental Control Technology who are interested in pursuing B.S. degree at that institution.

IV. Place of Course in College Curriculum

A. Free elective

B. This course meets a program requirement for the A.A.S. Environmental Control Technology Program.

C. Course transferability: a) for New Jersey schools go to the NJ Transfer website, www.njtransfer.org; b) For all other colleges and universities go to their individual sites.

V. Outline of Course Content

A. Refrigeration system piping design
B. Centrifugal water chillers, principles of operation, prevention maintenance procedures and control systems
C. Absorption water chillers, principles of operation, prevention maintenance procedures and control systems
D. Commercial refrigeration compressors, classification, applications and operating procedures
E. Special purpose valves and accessories, selection procedures
F. Calculating commercial refrigeration (product) loads
G. Psychrometrics, economizers and charts
H. Refrigeration cycle
I. Heat Pump Design

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes

At the completion of the course, students will be able to:

1. identify appropriate techniques to solve problems with refrigeration equipment (GE - NJ 4).
2. apply quantitative reasoning to refrigeration issues (GE - NJ 2).

B. Course Learning Outcomes

At the completion of the course, students will be able to:

1. Demonstrate an understanding of the principles and operation of various chillers, compressors and unloading devices
2. Follow proper engineering techniques in the selection of heat pump equipment
3. Analyze refrigeration piping layouts for possible design flaws
4. Understand the concepts of Outdoor and recirculating air in the context of economizer operation

C. Assessment Instruments

The following assessment methods may be used:

1. Projects.
2. Exams.
3. Lab Performance.
4. Demonstrations.

VII. Grade Determinants

A. Lab performance.
B. Exams.
C. Class participation.
D. Projects.

Modes of Teaching and Learning used in the Course:

A. Lecture/discussion.
B. Small-group work.
C. Laboratory work.
D. Student collaboration.

VIII. Text and Materials

No textbook. Instructor will provide all necessary material.

Please note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

IX. Resources

A. Reference books
B. Safety equipment
C. Economizer & Enthalpy control board

D. Sample commercial air conditioning system and components
E. Instructional videos/DVDs
F. Laptops, engineering design software as well as manuals, and various environmental controls technology-shop instruments and testers available in the lab.

X. Honors Option

Not applicable