

APPT 157: RF 401 ADVANCED MECHANICAL SYSTEMS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2024
Units:	7
Hours:	72 lecture, 36 laboratory per quarter (108 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Air Conditioning & Refrigeration Technology Apprenticeship Program.
Advisory:	Not open to students with credit in APPR 107.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- A student will be able to describe the function of limit controls.
- A student will be able to differentiate between primary and secondary source control.
- A student will be able to list methods of temperature control.

Description

Servicing industrial refrigeration and air conditioning systems. Covers alignment and repair of circulating pumps and compressors, as well as industrial valve applications and repair. Rigging procedures, refrigerant handling, and basic office computer skills also covered in computer lab.

Course Objectives

The student will be able to:

1. Identify and repair various types of circulating pumps
2. Identify, assemble, and repair various types of industrial valves
3. Perform service procedures for industrial HVACR systems
4. Perform hands-on rigging operations
5. Demonstrate basic office computer skills

Course Content

1. Identify and repair various types of circulating pumps
 - a. Types of pumps
 - b. Pump theory, open systems/closed loop systems
 - c. Pump and motor alignment
 - d. Change pump seals
2. Identify adjust and repair various industrial valves
 - a. Refrigeration valves - types and applications
 - b. General purpose valves - types and applications

- c. Identify assemble components
 - d. Valve repair
3. Perform service procedures for industrial HVACR systems
 - a. EPA regulations for large ton refrigeration applications
 - b. Large ton refrigerant recovery
 - c. Refrigerant pump-out and transfer procedures/push pull method
 - d. Hands on refrigerant transfer projects
 4. Perform hands-on rigging operations
 - a. Rigging safety protocol
 - b. Identify and tie various knots
 - c. Crane signals
 - d. Calculate safe working loads and sling configurations
 - e. Hands-on rigging operations using rigging equipment and machinery
 5. Demonstrate basic office computer skills
 - a. Excel spreadsheets
 - b. Recording data in computer files
 - c. Organize service and maintenance files
 - d. Web-based research of technical support information

Lab Content

Students will work individually and in teams on safe practices for transferring and handling refrigerant using the push pull method. Students will learn to assemble refrigerant valves.

Special Facilities and/or Equipment

1. Laboratory equipped with refrigeration and air-conditioning tools and equipment
2. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Results of written quizzes and tests
Satisfactory completion of shop projects
Comprehensive written final examination
Maintenance of a workbook of student's daily work activities

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Lab assignment
Group discussion
Demonstration

Representative Text(s) and Other Materials

International Pipe Trades Joint Training Committee, Inc.. Rigging. 2014.

De Mark, Larry. Signal Person Training Course, Version 4 with Student Guide. 2012.

International Pipe Trades Joint Training Committee, Inc.. Start, Test & Balance. 2018.

International Pipe Trades Joint Training Committee, Inc.. UA Pipe Fittings, Valves, Supports and Fasteners. 2015.

International Pipe Trades Joint Training Committee, Inc.. Pumps. 2015.

Pearson. Commercial HVACR Equipment Lab Manual. 2014.

International Pipe Trades Joint Training Committee, Inc.. Hydronic Heating and Cooling. 2016.

Auvil, Ronnie J.. HVAC and Refrigeration Systems Training Manual. 2014.

Although these textbooks are older than 5 years, they conform to national training standards and are considered seminal works in the discipline. We will adopt the next edition of each text, as it is published.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Readings from textbook
2. Writing assignments given in the laboratory
 - a. Complete a survey of the various pumps within the training facility
 - b. Write a report describing the properties of 10 of the pumps, including location, make, model, type, and purpose

Discipline(s)

Air Conditioning, Refrigeration, Heating