

# APPR 161: AIR CONDITIONING, PNEUMATIC CONTROLS, INSTRUMENTATION & PROCESS CONTROLS

## Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2021
Units:	5
Hours:	37 lecture, 86 laboratory per quarter (123 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Plumbing & Pipefitting Apprenticeship Program.
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

- 1- Draw and define the refrigeration cycle
- 2- Define customer complaints and ways to improve performance

## Description

Third-year course of the Plumber, Pipefitter & Service Tech Apprenticeship Program. Reviews the theory and application of related math and science as well as the vapor compression cycle and refrigeration components and systems.

## Course Objectives

The student will be able to:

- Explain the fundamentals of the theory and vapor refrigeration cycle.
- Explain the purpose and demonstrate how do use a pressure enthalpy diagram.
- Define HVAC equipment.
- Explain compressors' operation.
- Explain customer relations.

## Course Content

- Vapor Refrigeration Cycle
  - Define superheat, sub cooling, superheated gas and sub cooled gas
  - Draw out and define the refrigeration cycle
- Pressure Enthalpy Diagram
  - Find compressor ratio, net refrigeration effect
  - Trace out an entire system on an enthalpy diagram
- HVAC Equipment
  - DX systems, cooling towers, chillers, boilers, package and split systems
  - Define how these systems work and operate

### D. Compressor Operation

- Become acquainted with several different types of compressor hermetic, screw, scroll and reciprocating
  - Perform complete tear down of compressor and rebuild back together
- ### E. Customer Relations
- Understanding and listening to our customers' needs and pains
  - Perform in front of class one-on-one factual problems

## Lab Content

Students will work individually and in teams on practical projects using the Hampton trainers and compressor trainers demonstrating testing and repair in the following areas:

- Refrigeration cycle
- Tear down compressor and perform rebuild
- Troubleshoot problems on trainer
- Take sub cooling readings
- Take super heat readings
- Gauge and amp compressors

## Special Facilities and/or Equipment

- Lecture and laboratory classrooms with chalkboard
- Audio-visual equipment (slide, video, and overhead projectors)
- Supplemental handouts
- Shop work on Hampton refrigeration trainer; work on compressor trainers in shop

## Method(s) of Evaluation

- Written examination
- Hands-on demonstration
- Group and classroom participation

## Method(s) of Instruction

- Lectures and classroom discussions on refrigeration systems
- Laboratory (hands-on) refrigeration trainer
- Demonstrations of skills in front of classroom

## Representative Text(s) and Other Materials

UA Text Refrigeration. [HVACR Training Manual, Vol. 1](#). 2008.

Although this text is older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

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

- Readings from the UA [HVACR Training Manual, Vol. 1](#)
- Writing assignments include homework from textbook

## Discipline(s)

Plumbing