

# APPT 130: REVIEW & TURNOUT

## Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	3.5
Hours:	36 lecture, 18 laboratory per quarter (54 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Plumbing/Steamfitting & Pipefitting/Air Conditioning & Refrigeration Technology Apprenticeship Programs.
Advisory:	Not open to students with credit in APPR 130.
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 define Enthalpy.
- A student will be able to demonstrate ability to troubleshoot defective HVAC components.
- A student will be able to demonstrate proper soldering and brazing technique for copper tube.

## Description

A comprehensive overview of the entire plumbing, steamfitting, and refrigeration courses of instruction and preparation for completion examinations. Presentation of the latest current code and safety information. Planning and performing hands-on piping projects. Students perform hands-on troubleshooting projects for air conditioning systems.

## Course Objectives

The student will be able to:

1. Relate the current code and safety regulations to the pipe trades industry
2. Plan, organize, and implement a piping project
3. Perform hands-on troubleshooting projects for air conditioning systems
4. Pass the final examinations to turn out as a journeyman plumber, steamfitter, or refrigeration/air conditioning mechanic

## Course Content

1. Relate the current code and safety regulations to the pipe trades industry

- a. Uniform Plumbing Code
  - b. OSHA safety regulations
2. Plan, organize, and implement a piping project
    - a. Draw piping project
    - b. Material requisitions
    - c. Manipulative piping projects
    - d. Rigging review
  3. Perform hands-on troubleshooting projects for air conditioning systems
    - a. Review refrigeration and air conditioning controls
    - b. Review pneumatic and electronic controls
    - c. Draw wiring diagrams
    - d. Troubleshooting electrical control circuits
  4. Pass the final examinations to turn out as a journeyman plumber, steamfitter, or refrigeration/air conditioning mechanic
    - a. Plumbing final exams
    - b. Steamfitter final exams
    - c. Refrigeration and air conditioning final exams

## Lab Content

Students will work individually and in teams on piping projects and control circuit troubleshooting projects.

## Special Facilities and/or Equipment

1. Personal protective equipment
2. Laboratory with piping equipment, tools and measuring instruments
3. 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 exercises and final examination
- Satisfactory completion of hands-on projects
- Maintenance of a student's workbook with questions drawn from text
- Group and classroom participation

## 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

. [CAL/OSHA Pocket Guide For The Construction Industry](#). 2015.

American Technical Publishers. [Building Automation Control Devices and Applications](#). 2008.

American Technical Publishers. [Plumbing Service, Maintenance, and Repair](#). 2017.

- Auvil, Ronnie J.. HVAC and Mechanical Systems Training Manual. 2014.
- Auvil, Ronnie J.. HVAC Control Systems, 3rd ed.. 2013.
- Auvil, Ronnie J.. HVAC Control Systems: Work Book, 3rd ed.. 2013.
- CAL/OSHA. State of California Construction & Electrical Safety Orders. 2016.
- Carrier Corporation. General Training Air Conditioning (Fundamentals) GTAC-I, Modules 1-4. 1993.
- Carrier Corporation. General Training Electricity (Fundamentals) GTE-II, Modules 1-3. 1993.
- Carrier Corporation. General Training Electricity (Fundamentals) GTE-II, Modules 1-9. 1993.
- Cleaver-Brooks. Boiler Room Guide. 2016.
- De Mark, Larry. Signal Person Training Course Version 4 with Student Guide. 2012.
- eHazard Management, LLC. Low Voltage Qualified Electrical Workplace Safety. 2015.
- Frankland, Thomas W.. Pipe Template Layout. 2008.
- Frankland, Thomas W.. Pipe Trades Pocket Manual. 2008.
- Frankland, Thomas W.. The Pipefitters and Pipe Welder's Handbook. 2008.
- Garby, Ronald G.. ITP's Crane & Rigging Handbook. 2015.
- International Association of Plumbing and Mechanical Officials. 2016 California Plumbing Code California Code of Regulations Title 24, Part 5. 2016.
- International Association of Plumbing and Mechanical Officials. Uniform Plumbing Code. 2015.
- International Association of Plumbing and Mechanical Officials. Uniform Plumbing Code Study Guide. 2015.
- International Pipe Trades Joint Training Committee, Inc.. AutoCAD/ AutoCAD LT 2013 Level 1. 2013.
- International Pipe Trades Joint Training Committee, Inc.. Basic Electricity. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Drainage Systems. 2016.
- International Pipe Trades Joint Training Committee, Inc.. Drawing Interpretation and Plan Reading. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Gas Installations. 2016.
- International Pipe Trades Joint Training Committee, Inc.. Hydronic Heating and Cooling for United Association Journeyworkers & Apprentices. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Oxy-Fuel Practices. 2016.
- International Pipe Trades Joint Training Committee, Inc.. Pneumatic Controls. 2016.
- International Pipe Trades Joint Training Committee, Inc.. Pumps. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Refrigerant Controls. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Refrigeration Mechanical Equipment Service Manual. 2014.
- International Pipe Trades Joint Training Committee, Inc.. Related Math. 2016.
- International Pipe Trades Joint Training Committee, Inc.. Related Science. 2014.
- International Pipe Trades Joint Training Committee, Inc.. Rigging. 2014.
- International Pipe Trades Joint Training Committee, Inc.. Soldering and Brazing. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Standard for Excellence. 2015.
- International Pipe Trades Joint Training Committee, Inc.. Start, Test & Balance. 2014.
- International Pipe Trades Joint Training Committee, Inc.. Steam Systems. 2015.
- International Pipe Trades Joint Training Committee, Inc.. UA Foreman Training Manual. 2008.
- International Pipe Trades Joint Training Committee, Inc.. UA Pipe Fittings, Valves, Supports and Fasteners. 2015.
- International Pipe Trades Joint Training Committee, Inc.. United Association Piping Handbook and Offset Formulas. 2000.
- International Pipe Trades Joint Training Committee, Inc.. United Association Pocket Reference Chart. 2008.
- International Pipe Trades Joint Training Committee, Inc.. Water Supply. 2004.
- International Pipe Trades Joint Training Committee, Inc.. Welding Practices & Procedures for the Pipe Trades. 2016.
- ITT Bell & Gossett. System Syzer Calculator. .
- Jeffus, Larry. Welding Principles and Applications, 7th ed.. 2012.
- KORE-TECKX, Inc.. The Pipe Fitters Field Book. 2015.
- Mancomm, Inc.. 29 CFR - 1926 OSHA Construction Industry Regulations & Standards. 2017.
- Mechanical Service Contractors Association. MSCA Customer Service Training Series. 2009.
- National Fire Protection Association. NFPA 70E Standard for Electrical Safety in the Workplace, 2015 ed.. 2014.
- National Fire Protection Association. NFPA 99 Health Care Facilities Code, 2015 ed.. 2014.
- Pearson. Commercial HVACR Equipment Lab Manual. 2014.

Proctor, Thomas E., and Leonard P. Toenjes. PRINTREADING for Residential and Light Commercial Construction Part 2, 6th ed. 2016.

Riesberg, Marty, Terry Coleman, and Jim Simpson. Building Automation: Control Devices and Applications. 2008.

Ripka, L.V.. Plumbing Design and Installation, 4th ed. with workbook. 2012.

Smith, Lee. Mathematics for Plumbers and Pipefitters, 8th ed. 2013.

Smith, Russell E.. Electricity for Refrigeration, Heating and Air Conditioning, 9th ed. 2015.

Smith, Russell E.. Lab Manual: Electricity for Refrigeration, Heating and Air Conditioning, 9th ed. 2015.

South Bay Piping Industry Labor/Management Trust. TGO-Toxic Gas Ordinance Data Book. 2017.

Spriax Sarco. Design of Fluid Systems, Hook-ups. 2012.

Spriax Sarco. Design of Fluid Systems, Steam Utilization. 2006.

Steingress, Frederick M., Harold J. Frost, and Daryl R. Walker. High Pressure Boilers, 5th ed. 2012.

Steingress, Frederick M., Harold J. Frost, and Daryl R. Walker. High Pressure Boilers Study Guide, 5th ed. 2012.

Steingress, Frederick M., and Daryl R. Walker. Low Pressure Boilers, 4th ed. 2013.

Steingress, Frederick M., and Daryl R. Walker. Low Pressure Boilers Study Guide, 4th ed. 2013.

Trane. Air Conditioning Clinic Absorption Water Chillers. 2012.

Trane. Air Conditioning Clinic Centrifugal Water Chillers. 2012.

Trane. Air Conditioning Clinic Chilled Water Systems. 2012.

Trane. Air Conditioning Clinic Helical Rotary Water Chillers. 2012.

Trane. Air Conditioning Clinic Ice Storage Systems. 2012.

Trane. Ductulator I-P and SI Units. .

Trane. Psychometric Charts. .

USC, Foundation of Cross Connection Control. Manual of Cross Connection Control, 10th ed. 2014.

Although these texts are older than the recommended 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.

The above is a comprehensive list of textbooks that may be used to support this course. The student will use only those books assigned to their particular trade/program.

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

1. Readings from assigned textbooks:
  - a. HVAC Control Systems: Chapter 13, study question exercises, electrical control systems
  - b. Steam Systems: Chapter 9, Unit 3 workbook lessons, steam piping
2. Writing assignments given in the laboratory
  - a. Make a schematic drawing of a basic refrigeration control system with components
  - b. Quizzes from Steam Systems workbook lessons

## Discipline(s)

Plumbing