

# APPT 142: SF 102 RELATED MATH, DRAWING & RIGGING

## Foothill College Course Outline of Record

Heading	Value
<b>Effective Term:</b>	Summer 2024
<b>Units:</b>	3.5
<b>Hours:</b>	36 lecture, 18 laboratory per quarter (54 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Steamfitting & Pipefitting Technology Apprenticeship Program.
<b>Advisory:</b>	Not open to students with credit in APPR 124.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A student will be able to calculate piping off-sets.
- A student will be able to demonstrate knowledge in the selection and use of slings.
- A student will be able to describe isometric drawings.
- A student will be able to identify common pipe symbols.
- A student will be able to identify conventional drafting tools.
- A student will be able to identify proper rigging hardware and sling configurations.

## Description

Review of basic math before introducing new concepts, including pipe measuring and calculation of simple offsets. Students then learn drawing fundamentals before moving to instruction in isometric drawing. Instruction in identification and tying various types of knots, study of hands-on safe practices of rigging and hoisting piping materials. Students also learn basic computer skills.

## Course Objectives

The student will be able to:

1. Perform basic mathematical calculations
2. Describe pipe measuring terms and their application
3. Demonstrate the use and application of piping formulas
4. Demonstrate proficiency in calculating simple and complex piping offsets
5. Demonstrate the use of common drawing tools
6. Produce and interpret 3-D view and isometric drawings
7. Produce and interpret piping drawing symbols
8. Demonstrate ability to identify and tie types of knots used for rigging operations

9. Demonstrate the proper use and safety associated with hoisting and jacking equipment
10. Demonstrate ability to prepare a hoisting and rigging lift plan and to conduct a lift
11. Demonstrate ability to use chain falls and come-a-longs to lift pipe
12. Demonstrate crane operation for conducting a rigging operation and identify industry recognized signals used for hoisting materials and equipment
13. Demonstrate how to navigate a computer and some basic programs

## Course Content

1. Basic math calculations
  - a. Numeric values
  - b. Addition, subtraction, multiplication, and division
  - c. Decimals and fractions
  - d. Square root
2. Pipe measurements
  - a. Fitting nomenclature and measurements
  - b. Pipe measuring terms
  - c. Fitting take-off
  - d. Simple offsets
3. Use and application of piping formulas
  - a. Volume and areas
  - b. Grade and fall
4. Calculating simple and complex piping offsets
  - a. Right triangle formulas
  - b. Parallel and compound offsets
5. Common drawing tools
  - a. Identification and use of common drafting tools
  - b. Pencil and lead types
  - c. Architect's scale
6. 3-D view and isometric drawings
  - a. Plan and elevation views
  - b. Single line fitting views
  - c. Isometric axis
  - d. Single line isometric piping drawings
  - e. Isometric drawing of solids
7. Pipe drawing symbols
  - a. Identify fitting symbols
  - b. Draw various piping symbols
8. Tie types of knots
  - a. Identify the basic requirements of rope fastening
  - b. Explain why a rope fastening should be tied correctly and why it is chosen to complete the job safely
9. Hoisting and jacking equipment
  - a. Identify various types and use of rigging tools and devices as well as appropriate maintenance and safety requirements
  - b. Identify types of rigging hardware and sling configurations approved for use in rigging operations
10. Hoisting and rigging equipment
  - a. List hoisting and rigging hazards
  - b. Describe the responsibilities of rigging personnel
11. Chain falls and come-alongs
  - a. Describe safe practices in the use of chain falls and come-alongs
  - b. Lift pipe using chain falls and come-alongs

12. Crane operation and hoists
  - a. Identify types of cranes used in construction
  - b. Describe crane operating hazards
  - c. Demonstrate knowledge of international crane hand signals
  - d. Types of hoists
13. Basic computer skills
  - a. Learn how to send professional emails
  - b. Learn how to use office programs, such as Word and Excel

## Lab Content

1. Students will work individually and in teams on computing math formulas and calculations
2. Students will learn to draw and assemble basic water piping projects
3. Students will learn hands-on safe rigging practices

## Special Facilities and/or Equipment

1. Laboratory with drawing tools
2. When taught via Foothill Global Access, on-going access to computer with software and hardware capable of accessing email, learning management system, and video conferencing; 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

International Pipe Trades Joint Training Committee, Inc.. Related Math. 2016.

International Pipe Trades Joint Training Committee, Inc.. Drawing Interpretation and Plan Reading. 2015.

International Pipe Trades Joint Training Committee, Inc.. Rigging. 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 assigned textbooks, Rigging and Related Math
  - a. Related Math: Chapter 2, lessons on pipe measurements
  - b. Rigging: Chapter 1, articles and lessons on identifying and tying knots
2. Writing assignments given in laboratory
  - a. Essays and exams on mathematical calculations from textbook, Related Math
  - b. Draw and interpret 3-view and isometric drawings

## Discipline(s)

Plumbing