# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 100 SAFETY
**Number:** 100 **Hours:** 60.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the responsibilities and personal characteristics of a professional crafts person, explain the role that safety plays in the construction crafts, describe what job-site safety means, explain the appropriate safety precautions around common job-site hazards, and demonstrate the use and care of appropriate personal protective equipment.

**Tasks:**

PA113 - Practice Occupational Safety Health Administration (OSHA) safety standards as they relate to the industry.

PA114 - Demonstrate proper donning, usage, and care of personal protective equipment.

PA115 - Demonstrate proper safety procedures for hand and power tools.

PA116 - Follow shop and safety rules and procedures.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- College and Career Readiness Anchor Standards for Speaking and Listening

  *Supporting Anchor/Standards:*

  CCR.SL.6-12.4 Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the responsibilities and personal characteristics of a professional crafts person
Explain the role that safety plays in the construction crafts

Describe what job-site safety means
Explain the appropriate safety precautions around common job-site hazards
Demonstrate the use and care of appropriate personal protective equipment
Follow safe procedures for lifting heavy objects
Describe safe behavior on and around ladders and scaffolds
Explain the importance of the Haz-Com requirement and MSDS's
Describe fire prevention and fire-fighting techniques
Define safe work procedures around electrical hazards

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest

Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration

Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Saw blade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gages Robin air charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Presto lite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 200 RESERVED
**Number:** 200 **Hours:** 30.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to explain the importance of the Occupational Safety and Health Administration and explain the purpose of the Environmental Protection Agency and its effect on employees in the workplace.

**Tasks:**

201 RESERVED
202 RESERVED
203 RESERVED

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Discuss provisions, inspections and citations of OSHA.
Demonstrate compliance to EPA regulations for handling refrigerants.
Describe the common unsafe acts and unsafe conditions that cause accidents
Describe how to handle unsafe acts and unsafe conditions
Explain how the cost of accidents and illnesses affects everyone on site
Demonstrate the use and care of appropriate personal protection equipment
Identify job-site hazardous work specific to plumbers
Demonstrate the proper use of ladders
Demonstrate how to maintain power tools safely
Explain how to work safely in and around a trench
Describe and demonstrate the lockout/tagout process

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 300 BLUEPRINTS AND SKETCHING OF PIPE SYSTEMS
**Number:** 300 **Hours:** 60.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to recognize and identify basic blueprint terms, components, and symbols; relate information on blueprints to actual locations on the print; recognize different classifications of drawings; and interpret and use drawing dimensions.

**Tasks:**

PA301 - Interpret types of drawings.

PA302 - Interpret various lines used on drawings.

PA303 - Interpret specifications, and dimensions.

PA305 - Interpret piping systems according to color-coding.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Recognize and identify basic blueprint terms, components, and symbols
Relate information on blueprints to actual locations on the print
Recognize different classifications of drawings
Interpret and use drawing dimensions
Identify pictorial (isometric and oblique) schematic, and orthographic drawings, and discuss how different views are used to depict information about objects
Identify the basic symbols used in schematic drawings of pipe assemblies
Explain the types of drawings that may be included in a set of plumbing drawings and the relationship amoung the different drawings
Interpret plumbing-related information from a set of plumbing drawings
Discuss how code requirements apply to certain drawings.

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring

Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
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Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage

Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
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Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 400 PIPE SPECIFICATIONS AND SYSTEMS
**Number:** 400 **Hours:** 80.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the common types of materials and schedules; identify the common types of fittings and valves; identify and determine the kinds of hangers and supports; and demonstrate the ability to properly measure, cut, and join piping.

**Tasks:**

PA401 - Install pipe and connections according to manufacturer specifications.

PA402 - Follow plumbing standards, codes and specifications.

PA405 - Research the effects and corrective measures for thermal expansion in a piping system.

PA406 - Install various types of pipe insulation.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  *Supporting Anchor/Standards:*

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed

Follow task sheet instructions to complete practical projects
Identify the common types of materials and schedules of piping
Identify the common types of fittings and valves used with piping
Identify and determine the kinds of hangers and supports needed
Demonstrate the ability to properly measure, cut, and join piping

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD

Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 500 HAND AND POWER TOOLS
**Number:** 500 **Hours:** 20.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the basic hand and power tools used in the plumbing trade, demonstrate the proper maintenance procedures to be used for hand and power tools, and explain safety as it applies to plumbing tools.

**Tasks:**

PA501 - Use and maintain hand tools.

PA502 - Use and maintain power tools and equipment.

PA503 - Operate laser or transit level for sitework.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
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Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify the basic hand and power tools used in the plumbing trade
Demonstrate the proper maintenance procedures to be used for hand and power tools

Explain safety as it applies to plumbing tools
Demonstrate the proper use of pulumbing tools
Demonstrate the ability to know when and how to select the proper tool(s) for tasks
Describe the safety requirements for using plumbing tools

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
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Small Group Instruction
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Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
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Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
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Cue for Oral Response
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Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
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**Resources/Equipment:**

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Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 600 VALVES
**Number:** 600 **Hours:** 70.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the basic types of valves, describe the differences in pressure ratings for valves, and demonstrate the ability to service various types of valves.

**Tasks:**

PA601 - Use backflow prevention devices.

PA602 -Use types of valves that start and stop flow.

PA603 - Use valves that regulate flow.

PA604 - Use valves that relieve pressure.

PA606 - Disassemble and assemble various types of valves, e.g., gate valve, globe valve, flushometer.

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
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comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

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  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
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Skill:
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Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 700 COPPER PIPING OPERATIONS
**Number:** 700 **Hours:** 40.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the common types of materials and schedules used with copper piping; identify the common types of fittings and valves used with copper piping; identify the techniques used in hanging and supporting copper piping; and demonstrate the ability to properly measure, ream, cut, and join copper piping.

**Tasks:**

PA701 - Join, cut, and bend various types of copper pipe tube, e.g., solder, compression, flare, swage, press fit, brazing.

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, ream, cut, and join copper piping
Identify the types of materials and schedules used with copper piping
Identify the material properties, storage, and handling requirements of copper piping
Identify the types of fittings and valves used with copper piping
Identify the hazards and safety precautions associated with copper piping

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks

Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math

Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 800 PLASTIC PIPE AND TUBING
**Number:** 800 **Hours:** 44.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the common types of materials and schedules of plastic piping; identify the common types of fittings and valves used with plastic piping; and demonstrate the ability to properly measure, cut, and join plastic piping.

**Tasks:**

PA801 - Measure, cut and assemble Polyvinyl Chloride (PVC), Chlorinated Polyvinyl Chloride (CPVC), and Acrylonitrile-Butadiene-Styrene (ABS).

PA802 - Measure, cut and assemble cross-linked Polyethylene (PEX) plastic tubing and Polyethylene (PE).

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join plastic piping
Follow basic safety precautions for the installation, operation, and maintenance of plastic tubing

Identify types of materials and schedules of plastic piping
Identify proper and improper applications of plastic piping
Identify types of fittings and valves used with plastic piping
Identify and determine the kinds of hangers and supports needed for plastic piping
Identify the various techniques used in hanging and supporting plastic piping
Explain proper procedures for handling, storage and protection of plastic pipes

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions

Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances

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# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 900 PIPE HANGERS AND SUPPORTS
**Number:** 900 **Hours:** 22.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to demonstrate the ability to install a water distribution system using appropriate hangers and demonstrate the ability to install a DWV system using appropriate hangers and correct grade.

**Tasks:**

PA901 - Use hangers to secure horizontal and vertical pipe to masonry, metal and wood.
PA902 - Layout and explain various fixture carriers.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

**Instructional Activities:**

Knowledge:

Participate in co-operative group discussions.

Listen and participate in lecture by completing a review sheet

Participate in co-operative group theory projects

Review related rubric and procedures for project completion

Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices

Perform research work by reading, reviewing, and deciphering content material from trade journals

Perform research work by reading, reviewing, and deciphering content material from the Internet

Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material

Complete time cards describing daily work completed

Follow task sheet instructions to complete practical projects

Discuss how water moves from the source through the water distribution system to the fixture

Identify the major components of a water distribution system and describe the function of each component

Explain the relationships between components of a water distribution system

Remediation:

Re-teach major concepts

Review with teacher assistance

Provide individual tutoring

Provide peer tutoring

Engage student in study groups

Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks

Hone competition skills

Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets

Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1000 WATER DISTRIBUTION LINES
**Number:** 1000 **Hours:** 44.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to discuss how water moves from the source through the water distribution system to the fixture, identify the major components of a water distribution system and describe the function of each component, and explain the relationships between components of a water distribution system.

**Tasks:**

PA1002 - Rough-in water supply lines for residential and commercial fixtures according to manufacturer spec sheet.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.
  GEOMETRY
  Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
  Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping
Identify the major components of a water distribution system and describe the function of each component
Explain the relationship between components of a water distribution system

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest

Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gages Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Presto lite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1100 STEEL PIPE OPERATIONS
**Number:** 1100 **Hours:** 33.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the common types of materials and schedules used with carbons; demonstrate the ability to properly measure, cut, and join carbon steel piping; and identify the hazards and safety precautions associated with carbon steel piping.

**Tasks:**

PA1101 - Thread steel pipe with an adjustable die, power threading machine, and hand threader.

PA1102 - Measure, cut, ream, and assemble various types of steel piping.

PA1103 - Adapt steel pipe to other piping materials.

PA1104 - Assemble black steel pipe with mega press fittings.

PA1105 - Assemble Corrugated Stainless-Steel Tubing (CSST) pipe and fittings.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
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Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.
GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet

Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping
Recognize proper applications of carbon steel piping
Identify the material properties, storage, and handling requirements of carbon steel piping
Identify the various techniques used in hanging and supporting carbon steel piping

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
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Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions

Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1200 CAST IRON PIPE OPERATIONS
**Number:** 1200 **Hours:** 33.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify the common types of materials and schedules used with cast iron piping; identify common types of fittings and valves used with cast iron piping; demonstrate the ability to properly measure, cut, and join cast iron piping; and identify the hazards and safety precautions associated with cast iron piping.

**Tasks:**

PA1201 - Use tools for working with cast iron pipe.

PA1202 - Measure and cut cast iron soil pipe with various cutting methods.

PA1203 - Assemble cast iron with No Hub, Fernco, and rubber gasketed joints.

PA1204 - Research lead joints.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material

Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join cast-iron piping
Recognize proper and improper applications of cast-iron piping
Identify the material properties, storage, and handling requirements of cast-iron piping
Identify the types of materials and schedules used in cast-iron piping
Identify the types of fittings used with cast-iron piping
Identify the various techniques used in hanging and supporting cast-iron piping
Identify the hazards and safety precautions associated with cast-iron piping.

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach

Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene

Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1300 RESERVED
**Number:** 1300 **Hours:** 22.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to set, operate, and obtain differences in elevation using a builders level and stadia rod.

**Tasks:**

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Demonstrate the ability to properly measure, cut, and join carbon steel piping using end to end, end to center, center to throat, and overall improvements
Demonstrate the proper use of a builder's level.
Demonstrate the proper maintainance for caring for a builder's level

Remediation:
Re-teach major concepts

Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In

Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar

1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1400 DRAINS, STACKS AND SEWERS
**Number:** 1400 **Hours:** 99.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to use appropriate leveling devices to establish drainage pitch, know when and how to install backflow preventative valves, air test DWV and make necessary repairs, and rough in all appliances and fixtures requiring supply or drain connections.

**Tasks:**

PA1401 - Lay out and establish grade/slope for drain lines.

PA1402 - Install backwater prevention.

PA1405 - Rough-in drain lines for residential and commercial fixtures according to manufacturer specification sheet.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  *Supporting Anchor/Standards:*
  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects

Demonstrate the ability to install a building sewer piping system
Use a level to set the elevation of a floor or area drain
Install a drain
Install waterproof membranes and flashing

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD

Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools

Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1500 FIXTURES
**Number:** 1500 **Hours:** 63.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to describe the general procedures you should follow before installing any fixtures; demonstrate the ability to install bathtubs, shower stalls, valves, and faucets; demonstrate the ability to install water closets and urinals; and demonstrate the ability to install lavatories, sinks, and pop-up drains.

**Tasks:**

PA1501 - Install gravity, pressure assist, or flush valve type water closets.

PA1502 - Install bathtubs.

PA1503 - Install wall mounted fixtures.

PA1505 - Install kitchen sinks.

PA1506 - Install prefabricated shower base drains.

PA1507 - Install lavatories.

PA1509 - Install fixture traps.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  *Supporting Anchor/Standards:*
  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual

problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Describe the general procedures you should follow before installing any fixture
Demonstrate the ability to install:
bathtubs
lavatories
sinks
pop-up drains
water closets
urinals
shower stalls
valves
faucets
Identify the basic types of materials used in the manufacture of plumbing fixtures
Discuss common types of sinks, lavatories, and faucets
Identify and discuss common types of bathtubs, bath-shower modules, shower stalls, and shower baths
Discuss common types of toilets, urinals, and bidets
Identify and describe common types of drinking fountains and water coolers
Discuss common types of garbage disposals and domestic dishwashers

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions

Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)

Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1600 APPLIANCES
**Number:** 1600 **Hours:** 180.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to install general and home appliances required for convenience and sanitary operations.

**Tasks:**

PA1601 - Install a dishwasher.

PA1602 - Install electric and gas water heater.

PA1604 - Install clothes washing machine.

PA1605 - Install specialty water heaters (oil, tankless, indirect, or heat pump).

PA1606 - Install a water re-circulating pump.

PA1607 - Install a garbage disposal unit.

PA1608 - Install a sump pump.

PA1609 - Research a sewage ejector pump.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  *Supporting Anchor/Standards:*

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet

Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Install general and home appliances required for convenience and sanitary operations
Describe the installation of a dishwashers
Describe the installation of a electric water heaters
Describe the installation of a gas water heaters
Describe the installation of a clothes washing machines
Describe the installation of a oil-fired water heater
Describe the installation of a water re-circulating pumps
Describe the installation of al garbage disposal units
Describe the installation of a sump pumps
Describe the installation of a sewerage pump.

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks

Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1700 VENTS
**Number:** 1700 **Hours:** 75.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to install appropriate vent systems and termination related to fixture placement.

**Tasks:**

PA1701 - Apply principles and purposes of venting, e.g., common, individual, wet vent.

PA1703 - Explain vent termination.

PA1704 - Explain air admittance valves.

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

**Instructional Activities:**

Knowledge:

Participate in co-operative group discussions.

Listen and participate in lecture by completing a review sheet

Participate in co-operative group theory projects

Review related rubric and procedures for project completion

Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices

Perform research work by reading, reviewing, and deciphering content material from trade journals

Perform research work by reading, reviewing, and deciphering content material from the Internet

Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material

Complete time cards describing daily work completed

Follow task sheet instructions to complete practical projects

Install appropriate vent systems and termination related to fixture placement

Explain how waste moves from a fixture through the drain system to the environment

Identify the major components of a drainage system and describe their functions

Identify the different types of traps and their components, explain the importance of traps, and identify the

ways that traps can lose their seals
Identify the various types of drain, waste, and vent (DWV) fittings and describe their applications
Identify significant code and health issues, violations and consequences related to DWV systems

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance

Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted

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# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1800 PLUMBING SYSTEMS MAINTENANCE
**Number:** 1800 **Hours:** 105.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to perform the required maintenance needed on fixtures, traps, drains, valves, and piping systems for proper operation of the plumbing system.

**Tasks:**

PA1801 - Clear obstructions from lavatory drains.

PA1802 - Clear obstructions from main drain lines.

PA1803 - Clear obstructions from water closets

PA1804 - Repair/replace leaking water faucets or valves.

PA1808 - Research methods to thaw frozen pipes.

PA1811 - Replace all components in a gravity and/or pressure assist toilet tank.

PA1812 - Research sewer camera(s) for pipe inspection.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Career Education and Work Academic Standards
  13.3 Career Retention and Advancement

*Supporting Anchor/Standards:*

13.3.11 A. Evaluate personal attitudes and work habits that support career retention and advancement.
13.3.11 C. Evaluate conflict resolution skills as they relate to the workplace: Constructive criticism Group dynamics Managing/leadership Mediation Negotiation Problem solving

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended

material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Identify common repair and maintenance requirements for fixtures, valves, and faucets

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD

Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 1900 TESTS ON SYSTEMS
**Number:** 1900 **Hours:** 60.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to perform the necessary test procedures on piping systems as stated by code requirements.

**Tasks:**

PA1904 - Perform tests according to local plumbing and mechanical codes (air, hydrostatic, head pressure, etc.)

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

**Instructional Activities:**

Knowledge:

Participate in co-operative group discussions.

Listen and participate in lecture by completing a review sheet

Participate in co-operative group theory projects

Review related rubric and procedures for project completion

Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices

Perform research work by reading, reviewing, and deciphering content material from trade journals

Perform research work by reading, reviewing, and deciphering content material from the Internet

Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:

Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material

Complete time cards describing daily work completed

Follow task sheet instructions to complete practical projects

Demonstrate the ability to test a DWV system

Remediation:

Re-teach major concepts

Review with teacher assistance

Provide individual tutoring

Provide peer tutoring

Engage student in study groups

Use review games to provide reinforcement of material

Enrichment:

Advancement to the next task or set of tasks

Hone competition skills

Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 2000 ADVANCED PIPE FABRICATION
**Number:** 2000 **Hours:** 60.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to fabricate simple and complex three-line 45 degree equal and unequal offsets.

**Tasks:**

PA2001 - Calculate simple piping offsets.

PA2002 - Calculate three-line, 45° equal-spread offsets around a vessel.

PA2003 - Calculate three-line, 45° unequal-spread offsets.

PA2004 - Convert center, back throat, and/or face measurement to an end measurement.

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  GEOMETRY
  Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
  Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Fabricate simple and complex three-line 45 degree equal and unequal offsets

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
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Have Student Repeat Directions
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Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts

Books on Tape or CD
Allow Oral Answers for Testing
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Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
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Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing
Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

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Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 2100 PRESSURE BOILERS
**Number:** 2100 **Hours:** 120.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to identify components associated to various pressure boilers; explain the operation involved in boiler, steam, and hydonic units and the various accessories for proper operation; and identify and explain the purpose of a draft control and various safety devices.

**Tasks:**

PA2101 - Research various near boiler fittings, controls, and accessories.

PA2102 - Research various types of boilers and fuel sources.

PA2106 - Research the operation of water and steam boilers and their various controls.

**Standards / Assessment Anchors**

*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  *Supporting Anchor/Standards:*

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  GEOMETRY
  Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
  Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

**Instructional Activities:**

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Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material

Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Explain the operation and assemble a steam boiler including automatic water feed, pressure controls, and automatic cut-off

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
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Teacher Modeling
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Have Student Repeat Directions
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Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
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Highly Structured Classroom
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Provide Verbal and Written Directions
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All Vocabulary to be Defined Before Testing
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Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

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Student must:
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Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
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Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 2200 HYDRONIC HEATING SYSTEM
**Number:** 2200 **Hours:** 75.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to design a hydronic heating system with a primary and secondary loop systems; design a radiant floor system using PEX tubing and associated materials; and describe the operation of 3 and 4 way mixing valves, injection pump, tempering valves and safety controls of a hydronic system.

**Tasks:**

PA2201 - Research piping for a hydronic heating system.

PA2202 - Research a primary and secondary piping system.

PA2203 - Research a radiant system.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Science, Technology & Engineering, and Environmental Literacy & Sustainability Standards

*Supporting Anchor/Standards:*

3.2.9-12.O Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

3.2.9-12.Q Design, build and refine a device that works within given constraints to convert one form of energy into another form of energy.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

*Supporting Anchor/Standards:*

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
GEOMETRY
Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.
Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
Standard 2.3.HS.A.13 Analyze relationships between two dimensional and three dimensional objects.

**Instructional Activities:**

Knowledge:
Participate in co-operative group discussions.
Listen and participate in lecture by completing a review sheet
Participate in co-operative group theory projects
Review related rubric and procedures for project completion
Participate in a literacy (RWLS or Math) strategy to familiarize students with material, procedures, and practices
Perform research work by reading, reviewing, and deciphering content material from trade journals
Perform research work by reading, reviewing, and deciphering content material from the Internet
Troubleshoot HVAC/Plumbing hypothetical problems on computer program models identifying actual problems encountered on the job

Skill:
Model projects to be fabricated as per specifications using HVAC/Plumbing material and recommended material
Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Design and assemble a hydronic system using primary and secondary loops
Design and assemble a radiant floor system
Include the components and explain the operation of 3 and 4 way mixing valves and tempering devices within the system

Remediation:
Re-teach major concepts
Review with teacher assistance
Provide individual tutoring
Provide peer tutoring
Engage student in study groups
Use review games to provide reinforcement of material

Enrichment:
Advancement to the next task or set of tasks
Hone competition skills
Engage in advanced projects related to tasks

**Special Adaptations:**

Extended Time (assignments and/or testing)
Graphic Organizer
Chunking of Assignments/Material
Preferential Seating
Directions/Comprehension Check (frequent checks for understanding)
Study Guide
Directions and/or Tests Read Aloud
Adapted Tests and/or Assignments
Use of Calculator
Taking Tests in Alternate Setting (or if requested)
Verbal/Gestural Redirection (prompts to remain on task)
Drill and Practice (Repetition of Material)
No Penalization for Spelling
Copy of Teacher/Student Notes/Skeleton Notes
Small Group Instruction
Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
Teacher Modeling
Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
Regular Notebook Check
Use of Assistive Device (i.e. notepad, laptop, ect.)
Highly Structured Classroom
Syllabus for Major Projects
Limited, Short Directions
Grading Rubric
Communication Regarding Behavior & Consequences (PBS)
Clear Language for Directions
Use of Multisensory Approach
Provide Opportunities to Retest
Frequent Review Sessions
Use a variety of Modalities when Introducing Skills/Concepts
Books on Tape or CD
Allow Oral Answers for Testing
Provide Editing Assistance
Copies of Text for Home
Cue for Oral Response
De-Escalation Opportunities
Daily Classwork Check
Encourage Student to Check Work Before Turning In
Opportunities for Repeated Practice of MATH Skills
Provide repetition During Initial Instruction
Allow Pre-read of Questions Before Reading Written Passage
Provide Verbal and Written Directions
Multiplication Chart
All Vocabulary to be Defined Before Testing

Testing - Allow Dictation of Lengthy Answers
Time out
Graph Paper for Math
Encouragement to Participate in Positive Leadership Roles
Assistance with Bubble Sheets
Student Self-Evaluation for Behavior
Exempt from reading Aloud in Front of Peers

**Safety:**

Student must:
Comply with personal and environmental safety practices associated with shop recommended clothing, eye protection and the handling, storage, and disposal of chemicals/materials in accordance with school, local, state, and federal safety and environmental regulations
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

Student practical tasks will be graded based on rubrics if applicable
Tasks will be inspected, tested and graded to meet HVAC-R standards.(Reference National Mechanical, Plumbing, and Electrical Code Book)
Practical tasks include related theory testing applicable to the task and will be graded
Practical tasks include related assignments applicable to the task and will be graded

**Resources/Equipment:**

National Association of Home Builders (NAHB) Plumbing Second Edition By Michael A. Joyce 2012 National Association of Home Builders (NAHB) HVAC Second Edition By Eugene Silberstein 2012 National Center for Construction Education and Research (NCCER). (2001). Plumbing Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. National Center for Construction Education and Research (NCCER). (2000). Core Curriculum Trainee Guide, Wheels of Learning. Upper Saddle River, NJ: Prentice Hall. Simutech Multimedia Inc. Simulators for HVAC/Plumbing Training. Ottawa, ON, Canada. SIMUGAS ® Gas Furnace Simulator Information SIMUOIL ® Oil Furnace Simulator Information SIMUHYDRO ® Hot Water Boiler Simulator Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Use of residential and commercial HVAC/Plumbing equipment and Appliances for learning and testing purposes. Steel pipe Copper CPVC PVC Pex Arc Tig Oxy-Acetylene Brazing Soldering Electrical components Electrical Meters Freons Refrigeration Components Refrigeration Test Equipment Refrigeration Appliances Heating Components Heating Test equipment Heating Appliances Fuels OZ Recovery Turbo Tips Assorted NPT Taps Assorted Screw drivers Flashlights Allen key set Thermistor vacuum gauge Electronic leak detector Compressor Analyzer Sawblade set Duct board tools Nitrogen Regulator Charging scale Recovery tanks Digital thermometer Amprobe Multi-meter Mini- stripers Assorted benders Drill bit kit Strikers Insp. Mirror Chisel Assorted hammers Assorted pliers Assorted wrenches Levels Ref. Gauges Robinair charging station Efficiency test Angle Drill Hole Hawg Enviro-tech Vacuum pump Hand grinder Assorted saws Picks Shovels Rakes Prestolite Torch 1" snake 1/4 elect. snake Wire casing rip. 1/8" to 2" cutter Shop Vac Oilers Clamps Grease gun Lead Ladels Wire strippers Cats paw Elec. Hammer Drill Sawzaw Solder gun Putty Knives Aviation Snips Assorted cutters 16' Tape Measures Burring Reamers Soil Pipe Assembly tool Tri-Squares Squares Crow Bars Closet auger 1/2" Breaker Bar 1/2" Snap-On Ratchet 1/2"x 10" extension 1/2" x 5" extension Assorted deep well Assorted driversHyperlinks:

# Monroe Career & Technical Institute

## Course: Plumbing Technology

**Unit Name:** 2300 LADDERS AND SCAFFOLDS
**Number:** 2300 **Hours:** 45.00
**Dates:** Spring 2025

**Description/Objectives:**

Student will know and be able to describe the safety precautions required when setting up ladders and scaffolding used on the jobsite.

**Tasks:**

PA2301 - Use different types of ladders and scaffolds.

PA2302 - Set up and inspect stepladders, extension ladders, and scaffolding.

**Standards / Assessment Anchors**
*Focus Anchor/Standard #1:*

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

*Supporting Anchor/Standards:*

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

*Focus Anchor/Standard #2:*

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

*Supporting Anchor/Standards:*

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

*Connecting Anchor/Standard:*

- Pennsylvania Core Standards for Mathematics Standard 2.0

  *Supporting Anchor/Standards:*

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

  GEOMETRY

  Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles.

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Skill:

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Complete time cards describing daily work completed
Follow task sheet instructions to complete practical projects
Describe safe behavior on and around ladders and scaffolds

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Use of Computer (Access to)
Positive Reinforcement
Have Student Repeat Directions
Wait Time
Access to School Counselor
Use of Highlighter/Highlighted Text
Positive Reinforcement
Provide Frequent Feedback
Provide Frequent Breaks
Variety of Assessment Methods
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Assistance with Bubble Sheets
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Exempt from reading Aloud in Front of Peers

**Safety:**

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Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed areas
Follow manufacturer’s directions when using any product, tool, equipment, etc.
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

**Assessment:**

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