

CTE/ROP Plumbing Technology 1-2

San Diego County Office of Education - Sweetwater Union High School District Pacing Guide/Course Description

Course Length: 2 Semesters	Classroom Instruction: 180 hours
SUHSD Course Number:	Grade Level: 11, 12
SDCOE Course Number:	SDCOE Total Hours: 300 hours
CBEDS Number/Title:	Year of Implementation: 2012
Course Pre-requisites: Introduction to Plumbing 1/2	Articulation (school/credits): None
CTE Industry Sector: Building Trades and Construction	CTE Pathway(s): Engineering & Heavy Construction, Mechanical Construction, Residential & Commercial Construction
Job Titles: Plumber, Residential and Commercial, Drain Technician, General Construction Worker, Building Maintenance Worker, Residential & Commercial Maintenance	
Credential Information: Preliminary or Clear Full-Time Designated Subjects CTE Teaching Credential in Building Trades and Construction	
Required Textbooks: None	
Course Description: This course provides pre-apprentice, entry-level training in building industry trades in mechanical construction and or residential and commercial construction and related areas. Employment possibilities include plumber, residential and commercial plumber, drain technician, general construction worker, and building maintenance worker, residential and commercial maintenance. Instruction will cover safety, plumbing terminology, plumbing math and history, OSHA requirements, foundation design and construction of plumbing systems, plumbing fixture installations, repairs of plumbing systems, pipe, drain waste and vent systems, pipe sizing, materials, uniform plumbing code and green building technologies. Students use equipment which includes various hand and power tools associated with this trade.	

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Semester 1

- Unit 1: Introduction
- Unit 2: Safety/Hazardous Waste
- Unit 3: Plumbing Math
- Unit 4: Hand and Power Tools
- Unit 5: Advanced Blue Print Reading/UPC

Semester 2

- Unit 6: Plumbing Principals
- Unit 7: Advanced Drain Waste and Vent
- Unit 8: Advanced Drainage Systems
- Unit 9: Advanced Gas Systems
- Unit 10: Piping Materials
- Unit 11: Plumbing Maintenance
- Unit 12: Advanced Green Plumbing
- Unit 13: Advanced All Aspects of Industry
- Unit 14: Work Place Skills
- Unit 15: Job Acquisition Skills

Industry Certifications:

At the end of this course, the student may receive:

- Certificate of Completion in the Plumbing/Core Curriculum from NCCER

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<u>Semester 1- Unit 1 – Introduction (10 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>1A – Demonstrates understanding of course outline</p> <p>1B - Demonstrates understanding of syllabus</p> <p>1C - Demonstrates understanding of student expectations</p> <p>1D - Demonstrates understanding of teacher and student assessments</p>	<p><u>Career Technical Education:</u> *BTC/LT/ 9.1 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace settings. 9.3 Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals. 9.5 Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. *BTC/CWP/ A2.1 Use common hand tools and accessories, such as planers, shapers, clamping and gripping tools, pliers, wrenches, wood chisels, hammers, hand saws, and squares, safely and properly. <u>Core Academic:</u></p>	<p>1A – 2 hours: Course outline</p> <p>1B – 1 hour: Course syllabus</p> <p>1C – 1 hour: Student expectations</p> <p>1D – 1 hour: Assessments</p> <p>1E – 5 hours: Plumbing Code</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 1 - Unit 2 – Safety/Hazardous Waste (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>2A - Received safety instruction in the proper use of tools and equipment used in construction industry.</p> <p>2B - Identifies and uses properly power tools commonly used in the construction industry.</p> <p>2C - Introduction to electricity: Introduces trainees to the principles of electricity.</p> <p>2D - Identifies the community, health, safety, and environmental issues.</p> <p>2E - Identifies elements of storm water pollution prevention program (SWPPP).</p> <p>2F - Understands protocol with material that contains or may contain asbestos, mold, and lead</p> <p>2G – Introduction to OSHA training</p> <p>2H - Understands personal safety gear including harnesses.</p> <p>2I - Understands Tailgate Safety meetings.</p>	<p><u>Career Technical Education:</u> *BTC/CWP/ A2.1 Use common hand tools and accessories, such as planers, shapers, clamping and gripping tools, pliers, wrenches, wood chisels, hammers, hand saws, and squares, safely and properly. A3.1 Use portable power tools, such as single and compound miter saws, drills, sanders, saber saws, and routers, safely and appropriately. A6.3 Understand how to handle and dispose of toxic materials safely and use protective clothing as needed when using lacquers, acetone, thinners, staining materials, and so forth in an environmentally responsible manner. *BTC/EHCP/ B2.1 Use the common hand tools of the trade, such as rebar cutters, metal stud cutters/pliers, concrete floats/frescoes, sheet metal cutters/pliers, saws, hammers, chisels, and wrenches, safely and appropriately. B5.1 Understand the importance of scaffold and ladder safety. B5.2 Know the rules and responsibilities of the various governmental safety agencies and their impact on engineering and heavy construction. B5.3 Understand the importance of worksite safety as it pertains to hazardous waste disposal and procedures for containment of toxic and hazardous materials. B7.2 Understand environmental regulations that influence engineering and heavy construction projects. *BTC/HS/</p>	<p>2A – 4 hours: Construction safety</p> <p>2B – 4 hours: Safe power tool usage</p> <p>2C – 2 hours: Electricity</p> <p>2D – 4 hours: Health and safety</p> <p>2E – 2 hours: SWPPP</p> <p>2F – 1 hour: Asbestos, mold and lead</p> <p>2G – 1 hour: OSHA Training</p> <p>2H – 1 hour: Personal safety</p> <p>2I – 1 hour: Tailgate Safety</p>	<p><u>Teacher Resources:</u> <i>*Textbooks:</i> 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> <i>*Textbooks:</i> 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>6.1 Know the policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.</p> <p>6.2 Understand critical elements of health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.</p> <p>6.3 Know procedures for and regulations concerning the handling, storage, and disposal of hazardous materials.</p> <p>6.4 Know how regulatory agency laws and regulations are created and enforced.</p> <p>6.5 Evaluate past, present, and future impacts of technological developments on the environment.</p> <p><u>Core Academic:</u> *BTC/C/2.1R/RC/G9-10/ (2.6) Demonstrate use of sophisticated learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet).</p>		
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<u>Semester 1 - Unit 3 – Plumbing Math (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>3A – Measures and lays out materials using feet, inches, fractions using standard and metric measurements unit of measurement, calculates slope, understands inverts, offsets and angles.</p> <p>3B – Demonstrates trade related math computations calculating cubic yards of concrete and square footage of buildings in order to cut lumber per blueprint dimensions.</p>	<p><u>Career Technical Education:</u> *BTC/CWP/ A1.3 Convert scaled drawing measurements to full dimensional layout and template applications. A1.4 Know conventional measurement processes for cabinetmaking and wood products, linear measurements, and conversions of fractions and decimals. *BTC/EHCP/ B1.2 Calculate the required materials, such as soils, aggregate, asphalt, concrete, and pipe, for engineering and heavy construction applications. <u>Core Academic:</u> *BTC/A/1.1M/NS/G7/ (1.3) Convert fractions to decimals and percents and use these representations in estimations, computations, and applications. *BTC/A/1.1M/MR/G7/ (2.8) Make precise calculations and check the validity of the results from the context of the problem.</p>	<p>3A – 10 hours: Measurement and layout</p> <p>3B – 10 hours: Trade math</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 1 - Unit 4 – Hand and Power Tools (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>5A – Uses portable power saw.</p> <p>5B - Uses, chalk line, plumb bob, levels, line levels, framing squares, steel tape, laser level</p> <p>5C – Uses power/hand auger equipment.</p> <p>5D – Uses propane, map gas torch, brazing torch, acetylene, silver braze.</p> <p>5E – Uses power snake equipment.</p> <p>5F – Uses drill motors.</p> <p>5G – Uses portable power hole saw.</p> <p>5H – Uses reamers, cutters, ladders.</p> <p>5I – Uses soldering equipment.</p> <p>5L – Uses thread and die machines.</p>	<p><u>Career Technical Education:</u> *BTC/CWP/ A3.1 Use portable power tools, such as single and compound miter saws, drills, sanders, saber saws, and routers, safely and appropriately. A4.1 Understand the proper and safe use of stationary power tools used in the milling process, such as shapers, sanders, joiners, table saws, and band saws. *BTC/EHCP/ B3.1 Use portable power tools, such as circular saws, saber saws, reciprocating saws, and straight and right-angle drills, safely and appropriately. B3.2 Use pneumatic tools, such as jack hammers, rotary hammers, impact wrenches, concrete tampers, framing nail guns, roofing nail guns, and drills, safely and appropriately. *BTC/RCCP/ D3.1 Use portable power tools, such as circular saws, table saws, saber saws, drills, planers, and sanders, safely and properly. D6.2 Understand the processes and materials (e.g., structural, electrical, mechanical, finish) appropriate to the architectural design and residential construction. *BTC/HS/ 6.1 Know the policies, procedures, and regulations regarding health and safety in the workplace, including employers’ and employees’ responsibilities. 6.2 Understand critical elements of health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.</p>	<p>5A – 2 hours: Portable power saw</p> <p>5B – 1 hour: Chalk line, plumb bob, steel tapes</p> <p>5C – 2 hours: Power/hand auger</p> <p>5D – 2 hours: Soldering</p> <p>5E – 2 hours: Power snake</p> <p>5F – 2 hours: Drill motors</p> <p>5G – 2 hours: Portable power hole saw and angle drill</p> <p>5H – 1 hour: Reamers and cutters</p> <p>5I – 2 hours: Soldering equipment</p> <p>5L – 4 hours: Thread and die machines</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p><u>Core Academic:</u> *BTC/A/1.2S/IE/G9-12/ (1.a) Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.</p>		
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<u>Semester 1 - Unit 5 – Advanced Blue Print Reading/UPC (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>7A - Reads and interprets drawings, blueprints and other standard plans used in the plumbing/construction industry. Rough- ins, water management, lay-out plumbing systems using isometrics.</p> <p>7B - Reads and abides by building codes and other regulations pertaining to the plumbing/construction industry.</p> <p>7C - Estimates and orders materials from blueprints.</p> <p>7D - Prepares bid packages from given specifications.</p> <p>7E - Schedules labor and materials as needed on various projects relating to the plumbing/construction trade.</p> <p>7F - Demonstrates a basic understanding of cost control.</p> <p>7G - Budgets materials and labor in order to complete project under bid.</p>	<p><u>Career Technical Education:</u> *BTC/EHCP/ B4.1 - Know how to read, understand, and construct projects accurately from commercial specifications and blueprints, ensuring compliance with state and local building codes. B4.2 - Understand how to estimate the cost of supplies and materials for an engineering and heavy construction project. *BTC/MCP/ C4.2 - Understand how to estimate equipment and materials from blueprints and specifications. *BTC/RCCP/ D4.1 Interpret and use residential construction blueprints and specifications. D4.2 Understand how to estimate materials from blueprints and specifications. D4.3 Understand the sequencing of events for specific construction projects. *BTC/C/2.1R/RC/G9-10/ (2.1) Analyze the structure and format of functional workplace documents, including the graphics and headers, and explain how authors use the features to achieve their purposes. (2.6) Demonstrate use of sophisticated learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet). *BTC/C/2.1R/RC/G11-12/ (2.3) Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.</p>	<p>7A – 2 hours: Blueprint interpretation</p> <p>7B – 10 hours: Building codes</p> <p>7C – 1 hour: Estimating</p> <p>7D – 3 hours: Bid packages</p> <p>7E – 2 hours: Scheduling labor and materials</p> <p>7F – 1 hour: Cost control</p> <p>7G – 1 hour: Budgeting</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>*BTC/PSCT/ 5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks.</p> <p>*BTC/TKS/ 10.1 Understand construction processes and systems and their importance in construction technology.</p> <p>Core Academic: *BTC/A/1.1M/NS/G7/ (1.3) Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p>		
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<u>Semester 2 - Unit 6 – Plumbing Principals (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>8A - Demonstrates knowledge of basic plumbing principals and requirements, angles of branches of pipe.</p> <p>8B – Knowledge of plumbing values and devices.</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C1.1 Identify design solutions to given mechanical construction problems. C1.2 Calculate the required equipment and materials for mechanical construction applications. C1.3 Convert scaled blueprint drawing measurements to the full dimensions for a given mechanical construction project. C1.4 Apply conventional construction measurement processes accurately (geometric and trigonometric functions). <u>Core Academic:</u> *BTC/A/1.1M/MR/G7/ (2.6) Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work. (2.8) Make precise calculations and check the validity of the results from the context of the problem. *BTC/A/1.4VAPA/VA/ADV/G9-12/ (4.6) Develop written criteria for the selection of a body of work from their portfolios that represents significant achievements.</p>	<p>8A – 2.5 hours: Plumbing principals</p> <p>8B – 2.5 hours: Values and Devices</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 - Unit 7 –Advanced Drain Waste and Vents (10 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>9A - Interprets and understands DWV.</p> <p>9B - Understands proper drain, waste vent procedures associated with proper pipe sizing.</p> <p>9C - Understands all industry procedures and processes for excavation/slope and tie- ins.</p> <p>9D - Understands the installation of roof, floor and area drains, understands the proper</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C2.1 Use the common hand tools of the trade, such as ladders and safety gear (fall protection), pliers, wire strippers, meters, pipe wrenches, torches, and sheet metal shears and benders, safely and appropriately. C3.1 Use portable power tools, such as reciprocating saws, saber saws, chain saws, drills, threaders, and benders, safely and appropriately. C4.1 Know how to read, understand, and construct projects accurately from mechanical construction blueprints and specifications. C4.2 Understand how to estimate equipment and materials from blueprints and specifications. C4.3 Understand the sequencing of events for a specific mechanical construction project. <u>Core Academic:</u> *BTC/A/1.1M/NS/G7/ (1.7) Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest. *BTC/A/1.1M/GM/G8-12/ (8.0) Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. (11.0) Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. *BTC/C/2.1R/RC/G9-10/ (2.6) Demonstrate use of sophisticated learning tools by following technical directions</p>	<p>9A – 4 hours: DWV</p> <p>9B – 3 hours: Pipe sizing</p> <p>9C – 1 hour: Industry procedures and processes</p> <p>9D – 2 hours: Roof drains, floor, area drains</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>(e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet).</p>		
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<u>Semester 2 – Unit 8 – Advanced Drainage Systems (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>10A - Demonstrates how drainage systems work and how fittings are used and fitting allowance.</p> <p>10B – Knowledge of how DWV systems components such as pipes, drains, traps and vents work. Knowledge of clean outs and installation of drainage systems.</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C2.1 Use the common hand tools of the trade, such as ladders and safety gear (fall protection), pliers, wire strippers, meters, pipe wrenches, torches, and sheet metal shears and benders, safely and appropriately. C3.1 Use portable power tools, such as reciprocating saws, saber saws, chain saws, drills, threaders, and benders, safely and appropriately. C4.1 Know how to read, understand, and construct projects accurately from mechanical construction blueprints and specifications. C4.2 Understand how to estimate equipment and materials from blueprints and specifications. C4.3 Understand the sequencing of events for a specific mechanical construction project.</p> <p><u>Core Academic:</u> *BTC/C/2.2W/WS/G9-10/ (1.3) Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.</p>	<p>10A – 10 hours: Drainage systems</p> <p>10B – 10 hours: Pipes, drains, traps and vents, clean outs and installation of drainage systems</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 – Unit 9 – Advanced Gas Systems (20 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>12A - Understands gas safety and safety procedures.</p> <p>12B - Demonstrates how gas connections are made up, natural gas L.P. gas applications and systems installations.</p> <p>12C - Understands BTU's Introduction of gas piping sizing.</p> <p>12D - Identifies, by characteristics and size of gas fittings and appliances.</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C1.1 Identify design solutions to given mechanical construction problems. C1.2 Calculate the required equipment and materials for mechanical construction applications. C1.3 Convert scaled blueprint drawing measurements to the full dimensions for a given mechanical construction project. C1.4 Apply conventional construction measurement processes accurately (geometric and trigonometric functions). *BTC/MCP/ C2.1 Use the common hand tools of the trade, such as ladders and safety gear (fall protection), pliers, wire strippers, meters, pipe wrenches, torches, and sheet metal shears and benders, safely and appropriately. C4.1 Know how to read, understand, and construct projects accurately from mechanical construction blueprints and specifications. C4.2 Understand how to estimate equipment and materials from blueprints and specifications. C4.3 Understand the sequencing of events for a specific mechanical construction project. <u>Core Academic:</u> *BTC/C/2.1R/RC/G9-10/ (2.6) Demonstrate use of sophisticated learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet). *BTC/C/2.1R/RC/G9-10/ (2.6) Demonstrate use of sophisticated</p>	<p>12A – 2 hours: Gas safety</p> <p>12B – 2 hours: How gas systems work</p> <p>12C – 4 hours: Gas piping</p> <p>12D – 12 hours: Gas pipe sizing</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet).</p> <p>*BTC/C/2.2W/WS/G9-10/</p> <p>(1.3) Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.</p>		
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<u>Semester 2 - Unit 10 – Piping Materials (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>13A - Demonstrates common knowledge of most pipe materials ie. PEX, cast iron cpvc, copper, brass, steel, PVC and ABS applications.</p> <p>13B - Demonstrates solder/welding /solvents applications used in the plumbing construction industry.</p> <p>13C - Pex certification</p> <p>13D - Knowledge of hangers and supports. Students will learn the methods for attaching and running DWV, water supply in relation to structural elements.</p> <p>13E – Knowledge of testing systems.</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C2.1 Use the common hand tools of the trade, such as ladders and safety gear (fall protection), pliers, wire strippers, meters, pipe wrenches, torches, and sheet metal shears and benders, safely and appropriately. C4.1 Know how to read, understand, and construct projects accurately from mechanical construction blueprints and specifications. C4.2 Understand how to estimate equipment and materials from blueprints and specifications. C4.3 Understand the sequencing of events for a specific mechanical construction project.</p> <p><u>Core Academic:</u> *BTC/A/1.1M/NS/G7/ (1.3) Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.</p>	<p>13A – 1 hour: Industry piping</p> <p>13B – 1 hour: Solder and welding applications</p> <p>13C – 1 hour: Pex certification</p> <p>13D – 1 hour: Pipe hangers</p> <p>13E – 1 hour: Pipe testing</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 – Unit 11 – Plumbing Maintenance (10 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>14A - Installs, repairs and replaces plumbing fixtures, water heaters and installs appliances, sump pumps.</p> <p>14B - Clearing of stoppages, Installs, repairs broken pipe, purging of gas pipe and fixtures (rough-In) waste and water supply.</p> <p>14C – Knowledge of installing plumbing fixtures, devise and valves.</p> <p>14D – Knowledge of trouble shooting and repair of plumbing fixtures, valves, and plumbing devices.</p>	<p><u>Career Technical Education:</u> *BTC/MCP/ C4.5 Understand industry conventions for the creation and maintenance of construction logs. C4.6 Know the importance of customer service/relations as applied to project management and wholesale and retail sales. C5.1 Understand the safe use of electrical materials and electrical connection procedures.</p> <p><u>Core Academic:</u> *BTC/C/2.1R/RC/G9-10/ (2.6) Demonstrate use of sophisticated learning tools by following technical directions (e.g., those found with graphic calculators and specialized software programs and in access guides to World Wide Web sites on the Internet). *BTC/A/1.1M/MR/G7/ (2.2) Apply strategies and results from simpler problems to more complex problems. (3.2) Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems. *BTC/A/1.1M/GM/G8-12/ (8.0) Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.</p>	<p>14A – 2 hours: Plumbing repairs</p> <p>14B – 4 hours: Plumbing rough</p> <p>14C – 2hours: Plumbing fixtures</p> <p>14D - 2 hours: Trouble shooting</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 – Unit 12 – Advanced Green Plumbing (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>15A - Identifies and understands certified systems for Water</p> <p>15B - Identifies and understands certified systems for Energy</p> <p>15C - Identifies and understands certified systems for Practices and Materials</p> <p>15D - Identifies and understands certified systems for Indoor Environmental quality</p>	<p><u>Career Technical Education:</u> *BTC/HS/ 6.5 Evaluate past, present, and future impacts of technological developments on the environment. *BTC/TKS/ 10.1 Understand construction processes and systems and their importance in construction technology. <u>Core Academic:</u> *BTC/A/1.3HSS/WH/G10/ (10.3) Students analyze the effects of the Industrial Revolution in England, France, Germany, Japan, and the United States. (10.3.5) Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.</p>	<p>15A – 2 hours: Water</p> <p>15B – 1 hour: Energy</p> <p>15C – 1 hour: Practices and materials</p> <p>15D – 1 hour: Environmental quality</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 – Unit 13- Advanced All Aspects of Plumbing Industry (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>16D - Understands the underlying principles of technology.</p> <p>16H - Works on teams, teaches others, serves customers, leads, negotiates and works well with people from culturally diverse background.</p> <p>16I - Acquires and evaluates data, organizes and maintains files, interprets and communicates information as well as uses computer to process information.</p> <p>16K- Selects equipment and tools, applies technology to specific tasks and maintains and troubleshoots equipment.</p> <p>16L - Follow safety procedures and practices.</p>	<p><u>Career Technical Education:</u> *BTC/CWP/ A9.2 Understand the need for professional growth across all aspects of the industry, including financial, leadership, and advancement elements. *BTC/EHCP/ B4.2 Understand how to estimate the cost of supplies and materials for an engineering and heavy construction project. *BTC/RCCP/ D4.2 Understand how to estimate materials from blueprints and specifications. D4.3 Understand the sequencing of events for specific construction projects. D4.5 Understand industry conventions for the creation and maintenance of construction logs. D5.2 Know the safety procedures and practices in various work environment settings pertaining to residential and commercial construction. D6.1 Develop building plans and schedules by using processes common to residential and commercial construction. D6.4 Understand the phases of residential and commercial construction. D7.2 Develop financial plans for construction projects. D7.3 Understand the environmental regulations that influence residential and commercial design. (1.6) Calculate the percentage of increases and decreases of a quantity. *BTC/PSCT/ 5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-</p>	<p>16D – 1 hour: Principles of technology</p> <p>16H – 1 hour: Teamwork</p> <p>16I – 1 hour: Data evaluation</p> <p>16K – 1 hour: Equipment and tools</p> <p>16L – 1 hour: Safety procedures and practices</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>related issues and tasks.</p> <p>*BTC/HS/ 6.1 Know the policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.</p> <p>*BTC/ELR/ 8.2 Understand the concept and application of ethical and legal behavior consistent with workplace standards. 8.4 Understand how social, organizational, and technological systems work.</p> <p>*BTC/TKS/ 10.1 Understand construction processes and systems and their importance in construction technology. 10.10 Understand the need to obtain and maintain industry-standard, technical certifications significant to an industry sector.</p> <p>Core Academic: *BTC/A/1.1M/NS/G7/ (1.1) Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.</p>		
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<u>Semester 2 – Unit 14 – Work Place Skills (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>2L – Demonstrates problem solving skills.</p>	<p><u>Career Technical Education:</u> *BTC/PSCT/ 5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks. 5.2 Understand the systematic problem-solving models that incorporate input, process, outcome, and feedback components. 5.3 Use critical thinking skills to make informed decisions and solve problems. 5.4 Apply trouble-shooting strategies, including failure-analysis procedures, in three-dimensional product material and design work. 5.5 Apply the design process in the design, development, evaluation, and refinement of a prototype for a construction industry product. <u>Core Academic:</u> *BTC/A/1.1M/NS/G7/ (1.1) Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation. (1.2) Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers. *BTC/A/1.1M/MR/G7/ (2.1) Use estimation to verify the reasonableness of calculated results.</p>	<p>2L – 5 hours: Problem solving</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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<u>Semester 2 – Unit 15 – Job Acquisition Skills (5 hours)</u>			
Competencies	Standards	Suggested Pacing	Resources/Materials
<p>3A - Completes an appropriate resume and job application.</p> <p>3B - Acquires job interview techniques.</p> <p>3C - Attains awareness of advanced career and educational opportunities</p> <p>3D- Writes cover letter and business correspondence.</p>	<p><u>Career Technical Education:</u> *BTC/CWP/ A9.1 Understand the careers that are available in cabinetmaking and wood products manufacturing and related occupations (e.g., custom crafts, furniture making, marketing). *BTC/RCCP/ D1.1 Identify design solutions for residential construction problems. D1.5 Know the use of conventional construction formulas to determine production requirements. D4.4 Solve common residential construction problems, such as framing, plumbing, and electrical, by using the official codes adopted by the state and local building standards commission. D5.2 Know the safety procedures and practices in various work environment settings pertaining to residential and commercial construction. D6.4 Understand the phases of residential and commercial construction. D7.1 Understand significant historical trends in the construction industry. *BTC/PSCT/ 5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks. 5.3 Use critical thinking skills to make informed decisions and solve problems. *BTC/HS/ 6.1 Know the policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.</p>	<p>3A – 1 hours: Resume and job application</p> <p>3B – 2 hours: Job interview techniques</p> <p>3C – 1 hour: Advanced careers and educational opportunities</p> <p>3D – 1 hour: Cover letter, thank you letter, follow-up letter</p>	<p><u>Teacher Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p> <p><u>Student Resources:</u> *Textbooks: 1. Plumbing 2nd Edition by Michael A. Joyce 2. NCCER Contren Learning Series: Core Curriculum Introductory Craft Skills 4th Edition 3. NCCER Contren Learning Series: Plumbing Level One 3rd Edition</p>

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	<p>*BTC/TKS/ 10.10 Understand the need to obtain and maintain industry-standard, technical certifications significant to an industry sector. Core Academic: *BTC/A/1.1M/NS/G7/ (1.1) Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation. *BTC/C/2.2W/WSA/G11-12/ (2.5) Write job applications and résumés: a. Provide clear and purposeful information and address the intended audience appropriately. b. Use varied levels, patterns, and types of language to achieve intended effects and aid comprehension. c. Modify the tone to fit the purpose and audience. d. Follow the conventional style for that type of document (e.g., résumé, memorandum) and use page formats, fonts, and spacing that contribute to the readability and impact of the document.</p>		
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