PLB - PLUMBING

PLB 100 Plumbing Theory I
This course is designed to provide the student with instruction in plumbing practices applicable to all areas of plumbing. Emphasis will be placed on presenting the history of plumbing, materials, tools and ideas in the plumbing industry. Traditional approaches are covered to ensure that the student receives a broad exposure to all materials and practices potentially encountered in the workplace. NOTE: Prerequisites: Must take College Placement Exam and must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Explain the history of plumbing.
Explain the development of plumbing codes.
Define terminology associated with the trade, for example; fitting allowances
Specify fittings correctly.
Identify various patterns of fittings.
Define different types of sketches.
Demonstrate the proper use of measuring tools.
Calculate dimensions and interpret piping symbols.
Perform basic measurements (expressed in feet, inches, and fractions)
Accurately measure pipes, threads, runs and angles related to plumbing installations.
Calculate pipe sizes for drainage and service lines.
Identify tools used to install plumbing systems.
Explain the various methods of assembling pipe
Prerequisites: Must take College Placement Exam and must be employed by a Master Plumber.
5 Credits3 Weekly Lecture Hours

PLB 101 Plumbing Theory II
This continuation course is designed to stress good solid plumbing practices applicable to all areas of plumbing. Emphasis will be placed on presenting advanced concepts and materials in the plumbing industry. Traditional approaches are covered to ensure that the student receives a broad exposure to all materials and practices that may be encountered in the work place. NOTE: Prerequisites: Must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Test and repair gas piping.
Describe the relationship of threads per inch to pipe size.
Identify the various tools for threaded pipe.
Describe the use of the tools for threaded pipe.
Explain how pipe is cut, reamed, and threaded.
Define the terms associated with pipe threading.
Demonstrate the procedures necessary to properly tighten fittings on pipes.
Tighten fittings on pipes and valves.
Define fitting allowance.
Interpret center-to-center measurements.
Perform fittings to obtain end-to-end measurements.
Prerequisite: PLB 100.
5 Credits

PLB 102 Math for Plumbers
This course is designed to provide the student with relevant theory and skills in solving practical, industrially based, trade-related mathematical problems. Topics of instruction will include, but will not be limited to, calculating arithmetic expressions involving whole numbers, fractions, decimals, ratio, proportion, and percentages. The appropriate use of English/metric conversions, exponents, square roots, basic graph interpretation, and basic algebraic expression (formulas) manipulation will be presented. Emphasis is placed on providing the student with a problem-solving methodology applicable to new and future mathematical concepts. An introduction to the use of trigonometry for the solution of right and oblique triangles will also be included.
Upon successful completion of this course, students should be able to:
Perform the addition, subtraction, multiplication and division of fractions.
Utilize ratio and proportion.
Define the Pythagorean theorem and show its use in plumbing for finding angles and offsets.
Solve square roots and perimeter, area, and volume problems.
Use mathematical concepts as they relate to plumbing projects.
Define the types of measurements used in plumbing projects.
Identify the mathematical symbols.
Define the use of symbols in mathematics Define math procedure and math precedence.
Relate geometry to piping mathematics.
Define formulas/equations.
Utilize square root to solve triangles.
Describe the relationship of angles formed by intersecting lines.
Utilize the proper unit of measure for each task.
Interpret various pipe weights and use a pipe data sheet.
Calculate pipe clearances.
"Take off" for fittings.
State generic rules for fitting allowance.
Prerequisite: PLB 101.
5 Credits3 Weekly Lecture Hours

PLB 103 Installation & Repair
This course is designed to stress good solid plumbing practices applicable to all areas of plumbing materials, installations, and repair. Emphasis will be placed on advanced concepts and material selections in the plumbing industry. Traditional approaches are covered to ensure that the student receives a broad exposure to all materials and practices that may be encountered in the work place. Proper selection, installation of materials, application, and use of tools according to plumbing codes will be covered. In addition, practical application in the lab of the theoretical material covered in class will be stressed throughout the course. NOTE: Prerequisites: Must have completed one year apprenticeship and must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Explain how to install gas piping correctly.
Explain how to install domestic gas equipment safely.
Describe pipe threads.
Describe loop and circuit vents and how they are installed.
Identify and perform the various methods of supporting pipes.
Sketch the various devices used to support pipes.
Describe the purpose of cleanouts.
Identify the various locations and sizes of cleanouts.
Identify the size and types of drainage traps.
Describe siphonage and its effect on various types of traps.
Describe backpressure and how to prevent it.
Discuss capillary attraction and evaporation.
Describe the types of fixture traps and where they are used.
Explain why and where grease traps are used
Prerequisite: PLB 100 and PLB 101.
5 Credits3 Weekly Lecture Hours

PLB 104 Bathroom Installation
This course explains the manifold rules and regulations regarding shop safety. It demonstrates the right ways to lay out a job by the department of Labor and Industry, as well as, discuss job site hazards. In addition, it places emphasis on the power threader, soldering, brazing and safety. Students are taught how to create a detailed tool and material list as well as how to complete the manifold drawing to scale. NOTE: Prerequisites: Must have completed two years apprenticeship and must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Understand job site hazards and apply safety regulations.
Design and create a manifold drawing.
Identify appropriate symbols.
Demonstrate the power threader, soldering and brazing.
Create a detailed tool and material list.
Complete a manifold project.
Interpret the fitting allowance chart.
Rough in the waste for the bathrooms Design a bathroom according to a given plumbing code.
Create a tool and material lists for said bathroom.
Describe siphonage and its effect on various types of traps.
Describe backpressure and how to prevent it.
Discuss capillary attraction and evaporation.
Describe the types of fixture traps and where they are used.
Prerequisite: NONE New students should complete Placement Testing prior to registration. Visiting students may submit college transcript.
1 Credit3 Weekly Lecture Hours

PLB 110 Introduction to Plumbing
This introductory course in the Plumbing Technology Certificate program exposes students to the foundational knowledge needed to develop skills in the plumbing trade. This course presents basic plumbing concepts, plumbing lexicon and terminology, as well as the use of critical plumbing tools and equipment. Students also learn the basics of applications and installation for a residential plumbing system.
Upon successful completion of this course, students should be able to:
Describe the history of plumbing systems.
Use appropriate terminology in discussing plumbing projects and assignments.
Demonstrate knowledge of health and safety practices in the plumbing trade.

Distinguish plumbing tools and their uses.
Examine and identify plumbing configurations commonly used in a domestic water system.
Identify plumbing materials used in supply and drainage of a domestic water system.
Define major components of domestic plumbing.
Demonstrate knowledge of the sources and solvency of domestic water.
Prerequisite: Successful Placement Test Scores or (ENG 050 and REA 050) or ENG 099* or REA 075 (*may be taken concurrently).
3 Credits3 Weekly Lecture Hours

PLB 111 Faucets & Fixture Systems
This course focuses on fixtures and faucets used in domestic plumbing applications. It includes, but not limited to complete bathroom, kitchen, and laundry room fixtures, This course also emphasizes common design theories. Upon successful completion of this course, students should be able to: Identify various fixtures and their applications in industry. Demonstrate an understanding of the mechanical operations of fixtures and faucets. Explain troubleshooting techniques used in addressing plumbing problems. Demonstrate an understanding of ADA requirements in relation to domestic plumbing systems. Model layouts and designs for new bathrooms and kitchens. Illustrate rough installations of plumbing fixtures.
Upon successful completion of this course, students should be able to:
Identify various fixtures and their applications in industry.
Demonstrate an understanding of the mechanical operations of fixtures and faucets.
Explain troubleshooting techniques used in addressing plumbing problems.
Demonstrate an understanding of ADA requirements in relation to domestic plumbing systems.
Model layouts and designs for new bathrooms and kitchens.
Illustrate rough installations of plumbing fixtures.
Prerequisites: PLB 110 and TCS 141*. *May be taken concurrently.
3 Credits3 Weekly Lecture Hours

PLB 112 Plumbing Residential Service
This course presents an in-depth study of residential plumbing services. The course prepares students to diagnose and solve problems with potable water and waste water systems. In addition, students will learn how to work with fixtures, faucets, and equipment associated with residential plumbing systems.
Upon successful completion of this course, students should be able to:
Identify potable water and waste water delivery systems.
Demonstrate an understanding of problems related to potable water and waste delivery systems.
Troubleshoot and repair plumbing fixtures and faucets.
Identify pumps and their applications in domestic plumbing systems.
Prepare domestic plumbing systems for seasonal temperatures changes.
Detect in fixtures, the sources of leaks, odors and sounds reported by consumers.
Demonstrate competencies in customer services and professionalism.
Prerequisite: PLB 111 and HVA 106.
2 Credits1 Weekly Lecture Hour
2 Weekly Lab Hours

PLB 190 Plumbing Internship (1 credit)
College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 60 hour internship will earn 1 college credit for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.
1 Credit

PLB 194 Plumbing Internship (2 credits)
College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 120 hour internship will earn 2 college credits for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes.
2 Credits

PLB 199 Plumbing Internship (3 credits)
College-Sponsored Experiential Learning (CSEL) is designed to integrate on-the-job learning experiences with classroom studies. These experiences are structured either to explore career options or to prepare for a specific occupation. Students participating in the Cooperative Education and Internship Program gain college credit and are graded for their learning/work experience by the appropriate faculty. Students participating in this 180 hour internship will earn 3 college credits for this experience. Upon successful completion of this hands-on work experience, the student should be able to satisfy instructionally selected competencies from those below according to the number of credits to be awarded. NOTE To be eligible for an internship, students must: Have completed a minimum of 18 or more credits within the last 5 years. Have begun course work in their major (at least 9 credits). Have an overall grade point average (GPA) of 2.5. Obtain a written recommendation by a DCCC faculty within the discipline of the internship. Submit a current resume to the Office of Student Employment Services.
Upon successful completion of this course, students should be able to:
Explain three program-related concepts that have been applied during the work experience.
Describe the ways that technology is utilized in the work experience.
Analyze the culture of the host organization.
Analyze an operational process within the work experience.
Demonstrate how assigned tasks depend on successful communication.
Describe how time and activity are managed to meet work-imposed deadlines.
Describe an instance where problem-solving skills were needed to analyze a situation in the work experience.
Demonstrate specifically how job-related competence has improved.
Formulate a self-assessment for career growth and personal satisfaction.
Satisfy the competencies of the chosen CSEL placement (to be developed in consultation with the CSEL instructor).
Work closely with a faculty mentor in the student's program/major to complete a project which articulates how the experience helps the student achieve program outcomes
3 Credits

PLB 200 Heating Systems
This course is designed to help the heating professional become comfortable with the electrical portion of an installation or service call. The program covers basic electric circuits, flow of electricity, switches, grounding, electrical terms and principles, electric power in the home, electric wire and supplies, tooled and test equipment, transformers, electric heating components, wiring diagrams, practical wiring of a heating appliance, and troubleshooting. NOTE: Prerequisites: Must have completed two years apprenticeship and must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Identify basic electrical circuits.
Define two Laws of Electricity and understand fundamental electrical terms.
Describe how electric power gets to a home and some safety considerations.
Explain types and common uses of electrical wire (conductors).
Splice and connect wires.
Extend a circuit and some common electrical parts.
Use the proper tools and test equipment to perform basic electrical work.
Demonstrate how electrical power from the Power Company transformer can reduce to run low voltage components in a home.
Identify the essential electrical components of a heating system.
Perform the basics of wiring, schematics, ladder, and pictorial diagrams Read a schematic and ladder-wiring diagram, and wire a boiler.
Troubleshoot an electrical circuit.
Install gas utilization equipment in accordance with their listing and the manufacturer's instructions.
Perform methods of vent installations of venting systems based on the operating characteristics of the gas utilization equipment.
Adjust the burner input to the proper rate in accordance with the equipment manufacturers' instruction by changing the size of a fixed orifice, by changing the adjustment of an adjustable orifice, or by readjustment of the gas pressure regulator outlet pressure without overfiring.
Perform modifications to an existing appliance installation for the purpose of fuel conservation.
Prerequisites: Must have completed 2 years apprenticeship and must be employed by a Master Plumber.
2 Credits3 Weekly Lecture Hours

PLB 202 Blueprint Reading
This course was designed for plumbing and pipe fitting students who need to develop the ability to interpret trade blueprints and plan the installation of the required plumbing. The appropriate method to interpret all types of trade drawings and make orthographic or isometric sketches of plumbing installations will be discussed. The student will have the opportunities for extensive practice which provide reinforcement and additional performance skills will be presented. NOTE: Prerequisites: Must have completed three years apprenticeship and must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Read blueprints and sketch plumbing features.
Discuss the purpose of specifications and plumbing codes.
Measure scales lengths and uses of the architect's scale.
Discuss materials, construction, and pipe connections for a floor drain.
Identify floor plan symbols for sinks and other kitchen equipment and describe the details of kitchen planning.
Identify the floor plan symbols for bathtub, water closet, lavatory, and shower.
Interpret the rough-in sheet.
Discuss the installation of a wall-hung lavatory.
Show why isometric drawings are used in the plumbing trade.
Show pipe sizes on an isometric pipe drawing.
Prerequisites: Must have completed 2 years apprenticeship and must be employed by a Master Plumber.
3 Credits3 Weekly Lecture Hours

PLB 207 Cross Connection Control
This course presents the essential ingredients of blending theoretical and practical aspects of cross-connection controls along with specific guidelines concerning the theory of backflow prevention and administration. It provides extensive information on troubleshooting from a hands-on point of view and is designed to be used as an on-the-job troubleshooting tool. Standardized training in the backflow/cross-connection control field will be addressed. NOTE: Prerequisites: Must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Pass ASSE (American Society of Sanitation Engineers) Backflow Certification Exam for Testers.
Communicate historical data regarding cross-connections.
Perform the five methods of properly controlling backflow.
Articulate and define various cross-connections definitions.
Identify the various responsibilities of public and private agencies for cross-connection controls.
Apply, define and identify the appropriate plumbing codes and standards.
Discuss basic hydraulics and the fundamentals of cross-connection controls.

Utilize and apply the safety program material and implementation into the workplace.
Implement installation guidelines for backflow prevention assemblies.
Observe the condition of the test gage equipment during all steps of the field test procedure.
Troubleshoot and repair the problem with a backflow prevention assembly.
Document the validity of the inspection and certification of a backflow prevention assembly.
Report the results of the field-testing operations.
Maintain and generate all records and certifications of all backflow prevention assembly tests performed.
Prerequisites: Must have completed 2 years apprenticeship and must be employed by a Master Plumber.
3 Credits3 Weekly Lecture Hours

PLB 208 Philadelphia Plumbing Codes
This course reviews the major aspects of Philadelphia Plumbing Code (1996 Edition). Emphasis will be placed on general regulations, plumbing definitions, materials, sanitary and storm water systems. Students will be exposed to sketching, laying out, and sizing of various systems. NOTE: Prerequisites: NOTE: Prerequisites: Must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Determine if a back-flow prevention assembly is necessary.
Check with your inspector on the appropriate assembly required for the job.
Determine the minimum water pressure required at the most remote outlet on any potable water system.
Identify the requirements on a potable water system flush-out valve.
Identify and operate the vacuum breaker on the discharge side.
Demonstrate how a direct connection to a sewer or waste line can be properly utilized.
Connect and identify appropriate pipelines.
Size drainage and vent lines.
Prerequisites: Must have completed 2 years apprenticeship and must be employed by a Master Plumber.
3 Credits3 Weekly Lecture Hours

PLB 209 International Plumbing Codes
This course is designed to assist students in understanding codes and adjacent code provisions. It addresses various codes founded upon certain basic principles of environmental sanitation and safety through properly designed, acceptably installed, and adequately maintained plumbing systems will be addressed. NOTE: Prerequisites: Must be employed by a Master Plumber.
Upon successful completion of this course, students should be able to:
Correct all plumbing violations.
Size and design plumbing systems for residential and commercial buildings.
Define various plumbing systems code.
Change the direction of flow without restrictions regarding drainage fitting patterns.
Apply the standards to control all materials, systems, and equipment used in the construction, installation, alteration, repair, or replacement of plumbing or drainage systems or parts.
Test joints and connections in the plumbing system requiring gas tight and watertight for the pressure required.
Apply the plumbing code regarding how fixtures shall be separately trapped by a water seal trap and placed as close as possible to the fixture outlet.
Demonstrate the proper handling of liquid waste containing grease, flammable wastes and other ingredients harmful to the building drainage system.
Confirm the requirements for plumbing fixtures for accessible use and their installation.
Prerequisites: Must have completed 2 years apprenticeship and must be employed by a Master Plumber.
5 Credits

PLB 210 Drains and Sewers
This course focuses on residential drainage and venting systems. It provides explanations of the elements and processes involved in the drainage systems, as well as instructions on appropriate applications. Student will also learn how to diagnosis blockage and slow drain problems associated with improper installation, inferior materials and improper venting.
Upon successful completion of this course, students should be able to:
Design residential drainage, waste and venting systems.
Determine proper fall and sizing for common bathroom groups.
Differientiate between public and private sewage disposals systems.
Identify obstructions in branch drains, waste and soil lines.
Diagnose problems in drainage and venting systems.
Install testing equipment according to local code requirements as pertains to drain lines and venting.
Prerequisite: PLB 112.
3 Credits3 Weekly Lecture Hours

PLB 211 Advanced Plumbing
This course introduces advance piping principles as they apply to the plumbing industry. Students learn to identify and use a variety of piping, fittings, and materials in domestic water and drainage installations. These installations could be in new or retro-fit applications.
Upon successful completion of this course, students should be able to:
Identify various material, components, and accessories for water and drainage installation and venting applications.
Explain the differences in piping and fittings used in domestic water systems and drainage systems.
Demonstrate various installation techniques for copper, plastic and domestic water lines.
Idenify drainage fitting patterns, bend, degrees and their common application.
Calculate pitch and grade.
Connect different drainage fittings of dissimilar materials.
Design a bathroom draw a sketch of pipe.
Evaluate gas piping distribution and associated accessories.
Design gas line based on BTU requirements.
Demonstrate knowledge of drilling, boring, and notching techniques as well as installations.
Apply the appropriate techniques to install, repair, and maintain pipes in accordance with local and international plumbing codes.
Prerequisite: PLB 210.
2 Credits1 Weekly Lecture Hour
2 Weekly Lab Hours

PLB 212 Installation of Plumbing Related Fixtures
The purpose of this course is to help students develop the fundamentals skills required to install plumbing related fixtures, faucets and appliances in residential homes. The course builds on the skills students acquire in the introductory Faucets and Fixtures course.
Upon successful completion of this course, students should be able to:
Install selected fixtures.
Adjust applications for proper appearance and function.
Analyze conditions that impact the installation of fixtures.
Demonstrate knowledge of code requirements for residential fixtures.
Demonstrate knowledge of water and drainage testing systems in preparation for testing.
Prerequisite: PLB 211.
2 Credits1 Weekly Lecture Hour
1 Weekly Lab Hour

PLB 213 Principles of Prod Hot Water
This course presents the principles of heating water for consumption in a variety of applications. Students also learn the theories and practice of using different fuels to produce hot water systems. In addition, they gain knowledge of several types of hot water systems configurations as well as how to install residential hot water heating systems.
Upon successful completion of this course, students should be able to:
Demonstrate an understanding of the theory of British Thermal Unit.
Explain the principles of domestic hot water heating and circulation.
Analyze the different energy-fuel sources for hot water.
Explain the advantages and disadvantages of various fuel options.
Explain the process for selecting the proper water heater to meet the consumer requirements.
Describe the different hot water heating distribution systems.
Identify the valves, safety devices and control components of domestic hot water heating systems.
Demonstrate an understanding of the combustion and venting processes of gas and oil fired hot water units.
Troubleshoot gas, electric, and oil water heater systems.
Discuss layout of solar hot water heaters.
Describe the operation of residential boilers.
Demonstrate an understanding of radiant heating systems.
Prerequisite: PLB 212.
3 Credits3 Weekly Lecture Hours